May 1, 1939

TEEL

CTION • PROCESSING • DISTRIBUTION • USE

ESTABLISHED 1882

OLLED QUALITY STRIP & SHEETS
CIENT ECONOMICAL PROCESSING
STEP UP PRODUCTION AND PROFITS

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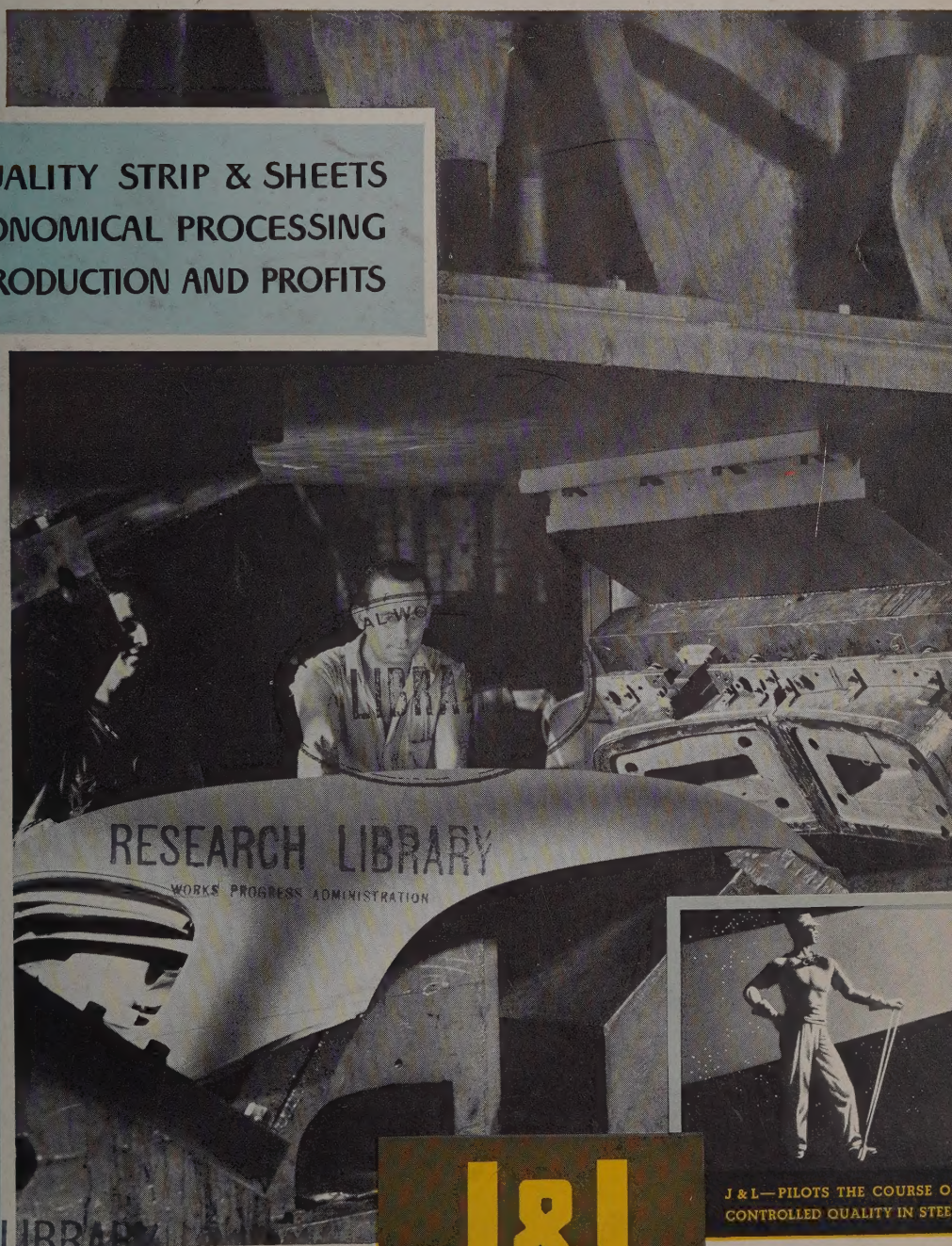

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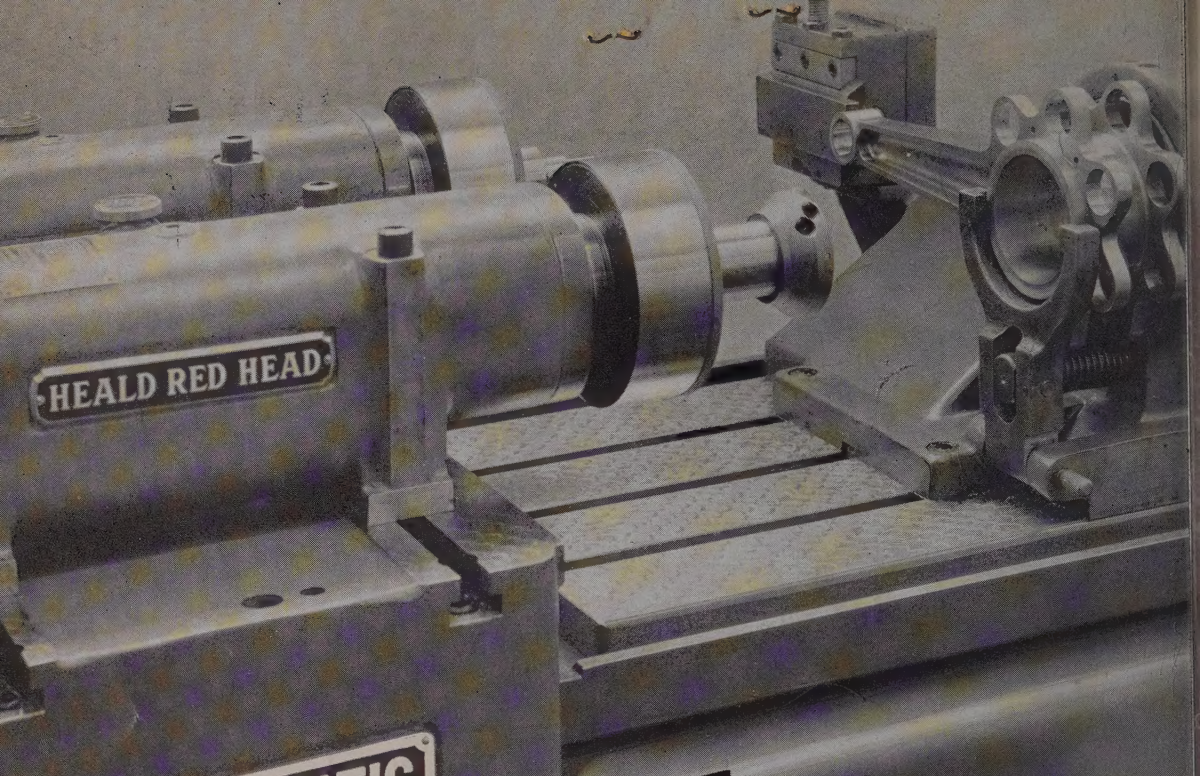
N PROGRESS TO AMERICAN INDUSTRY

J&L STEEL



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FOR AIRCRAFT PARTS

For finishing aircraft parts which require a high degree of accuracy and finish, leading manufacturers of aircraft equipment find Heald Bore-Matics extremely satisfactory. Especially on such parts as master rods, articulating rods, pistons, bearing liners, tappet guides, piston pins, propeller bushings – wherever precision is vital for successful performance.

Heald Bore-Matics can be used for precision boring, facing, and turning operations, either finishing one or more surfaces in the same part or handling several parts at once. In every case results are characterized by very close accuracy for size, location and alignment, as well as an exceedingly fine finish.

An illustrated bulletin describing Bore-Matic installations on aircraft work will gladly be sent on request.

Above is a No. 47
precision boring
crank hole and th
wrist pin hole in

Below is a No. 49
and finish bores th
in aluminum pist

THE HEALD MACHINE CO. Worcester, Mass.

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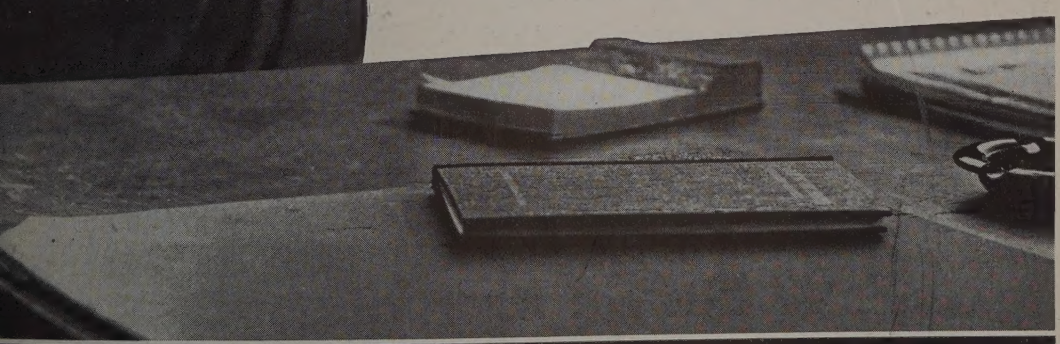
WHETHER you need a carton, a keg, a case or a carload of bolts, nuts or other threaded products, you'll find it's easy to get what you want by 'phoning your Bethlehem distributor. He carries a good stock and can readily supply your immediate needs. For special cases, his rush order to our Lebanon, Pa., plant will start your goods on their way from the plant within three hours.

You can depend on Bethlehem bolts. They are consistently high in quality. Threads are clean-cut and smooth-fitting; heads and nuts fit wrenches snugly. And every Bethlehem bolt is backed by a name that stands for quality in steel, by a company having 50 years' experience in making fine steels.



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the outstanding characteri

NATIONAL STEEL HIGH TENSILE ALLOY

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The unusual ductility of this high tensile s
it to be cold formed into such difficult pa
illustrated at the left. Similar examples of
cold-formability are found in other appli
important new uses are being developed a

NOTE THESE FEATURES!

- √ Unusual Ductility
- √ High Yield Point and Ultimate Strength
- √ High Fatigue and Impact Resistance
- √ Good Weldability
- √ Corrosion and Abrasion Resistance

Its Inherently Finer Grain Makes Al

National Steel high tensile alloy is an inherently finer grained high tensile steel with unusual properties which engineers and fabricators have been actively seeking as an answer to their special and varied problems.

If you have an engineering or prod
lem that requires a high strength steel
ductility, you may find an answer
Steel high tensile alloy. We shall be
you submit your problems to us.

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DIVISION OF

NATIONAL STEEL CORPORAT

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inent acid-proofing on
of pickling equipment:

- **SCRUBBERS**
- **STACKS**

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SEWERS

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In all phases of steel mill and galvanizing plant operations Goodyear rubber rollers are delivering exceptionally long, high tonnage service. Their dependability, economy and long life are *mill-proved!*

The secret of their better service is *better compounding.* As the world's largest manufacturer of rubber, Goodyear has outstanding experience in compounding rubber to satisfy most exacting requirements.

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Further to insure satisfactory service all Goodyear rollers are specified by the G.T.M.—Goodyear Technical Man—after a careful study of the requirements of your particular operation. They can be supplied complete on shafts built to your specification, or applied to your present shafts.

A talk with the G.T.M. on rollers may save you money, as it has so many other mills. To bring him to your office, write Goodyear, Akron, Ohio, or Los Angeles, California—or phone the nearest Goodyear Mechanical Rubber Goods Distributor.

Centennial of Charles Goodyear's discovery of vulcanization.

THE GREATEST NAME IN RUBBER

GOODYEAR

MIDVALE

FOR JOBS THAT MUST STAND REAL PUNISHMENT

This die holder is made for what is one of the largest extrusion presses ever built. Chrome, tungsten, molybdenum, it is specially heat treated for its really tough job.

Midvale is accustomed to being called on for jobs that are off the beaten track, because Midvale frequently requires for itself exactly such things as this die holder. Further, Midvale has an experience and record in special alloys and their treatment that can be matched in very few other places.

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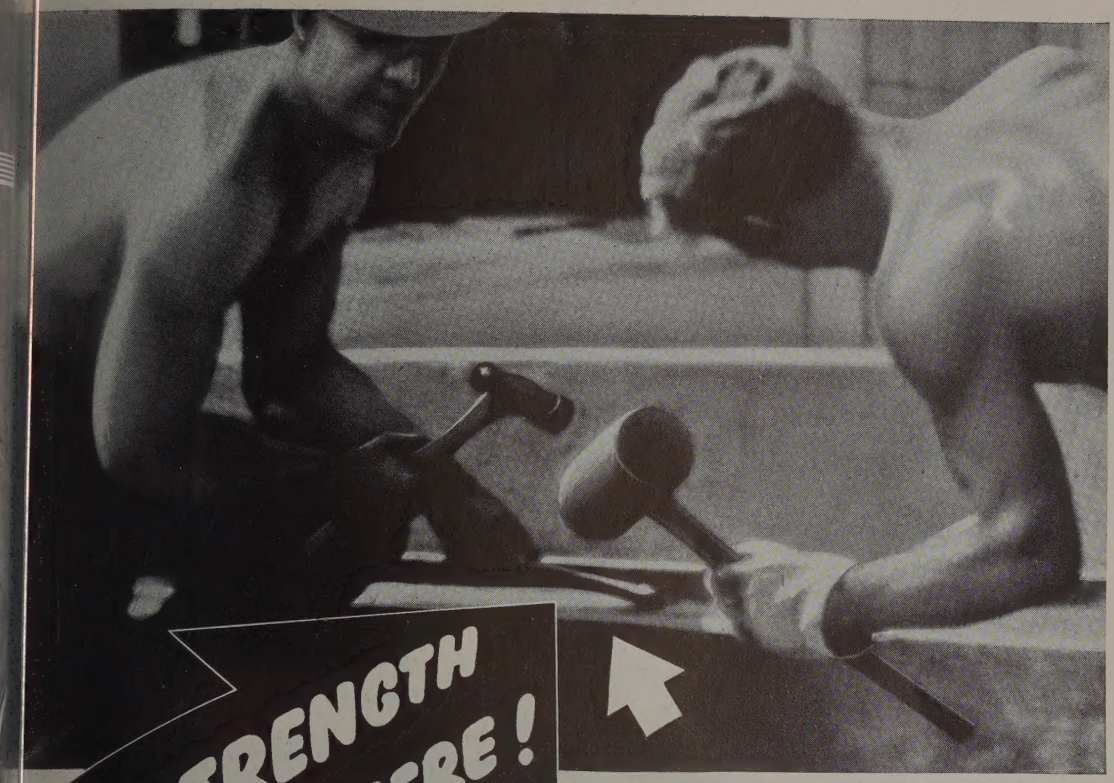
OFFICES: *New York* • *Chicago* • *Pittsburgh* • *Washington* • *Cleveland* • *Sa*



RA STRENGTH
VELOPED HERE!

...BECAUSE TELLURIUM LEAD "WORK-HARDENS"

Thud! Down comes the mallet. A sheet of Tellurium Lead is being bent over the top of an acid tank.

Down comes the mallet again — and again. And each succeeding blow makes the Tellurium Lead at that turn-over point not weaker — but stronger. This lead develops increased toughness under stress. *It work-hardens.*

Rolling and stretching have the same effect on Tellurium Lead as hammering. And where vibration occurs, this capacity to develop latent strength minimizes buckling and creeping. When heat changes are frequent, Tellurium Lead gives improved resistance to fracture.

The other outstanding advantage of Tellurium Lead is this: It gives increased resistance to sulphuric and other corrosive acids, even at temperatures that approach the melting point of the metal. In plant after plant, it has prolonged the useful life of equipment... and reduced the number of shut-downs for repairs.

Tellurium Lead of our manufacture is time-tried St. Joe chemical lead alloyed with a small quantity of tellurium. It gives the advantages of this well-known chemical lead plus important new ones. Yet now, it costs only a fraction of a cent more per pound than chemical lead. Available in sheets, pipe and coils. For further facts, write to nearest branch.

Typical User Reports

"I wish to say that your Tellurium Lead pipe has proved all you claimed. It is easy to weld and easy to flange. Also the flanges stand up a good deal better than ordinary lead as they seem to actually become stronger at the turn-over point."

Another company writes: "We lined one of our tubs with your Tellurium sheet lead. After eight months, the lining shows very little if any corrosion due to the action of the 10% boiling sulphuric acid. It promises to have a much longer useful life than the lead previously used."

EAD COMPANY

imore, Buffalo, Chi-
Cincinnati, St. Louis;
Lead Co., Boston;
Bros. Co., Philadel-
.ead & Oil Co., Pitts-
.ead Works, Atlanta;
al Co., Ltd., Toronto,
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TELLURIUM LEAD

FOR THE ULTIMATE IN MODERNIZATION

LANDISiz your THREAD

Manufacturers of Process Control Instruments

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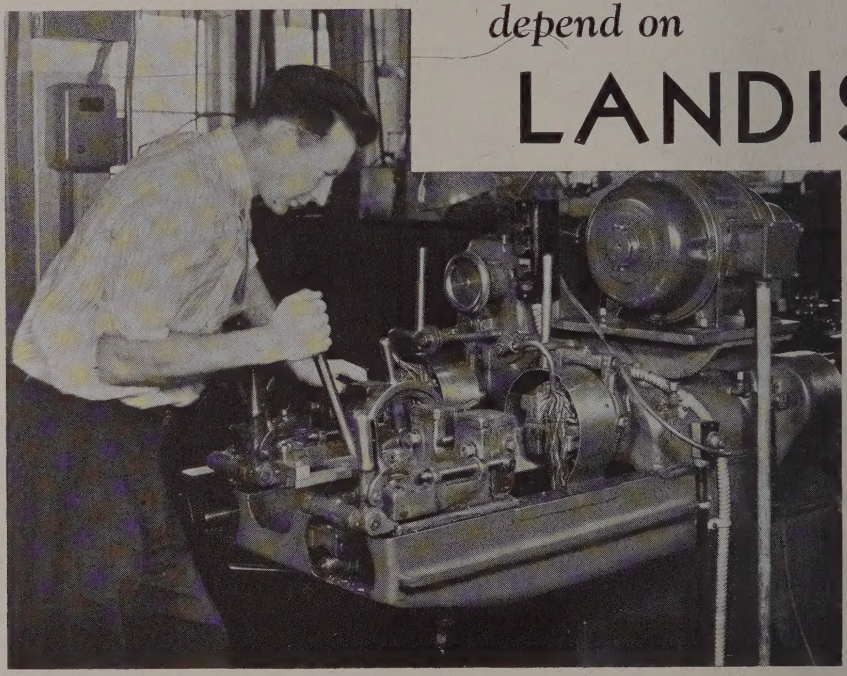


The Foxboro Co., Foxboro, Mass., manufacturers of modern process controlling instruments, have for many years used LANDIS Thread Cutting Equipment to cut threads on many of the small parts which are used in their Temperature Controllers and other recording devices.

The first LANDIS equipment, a LANDMATIC Head, was purchased by the Foxboro Company in 1926. The fine performance of this head is reflected by the fourteen additional die heads and threading machines which this company have installed over a period of the past twelve years.

To be *Modern* LANDISize your Threads

Write for additional information

LANDIS MACHINE CO., In
Waynesboro, Penna.

EADER Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Problem Vital

r:

sed to note that the ciety of Tool Engineers considerable effort to- ing the very prevalent chinery decreases em- TEEL, March 20, p. 25.) this problem is of vital o all branches of in- especially to conveyer s. I say this because those industries most pected of having con- unemployment. Con- ommonly called labor es; however, we know labor serving devices, kers to do a better job, solute minimum of the gue.

have been cases where , working with produc- rs in various plants, ed a system whereby uld be revamped and an unusual extent. In se rare instances the workers involved was h cases are an excep- , and certainly not the up production usually ring men rather than hem.

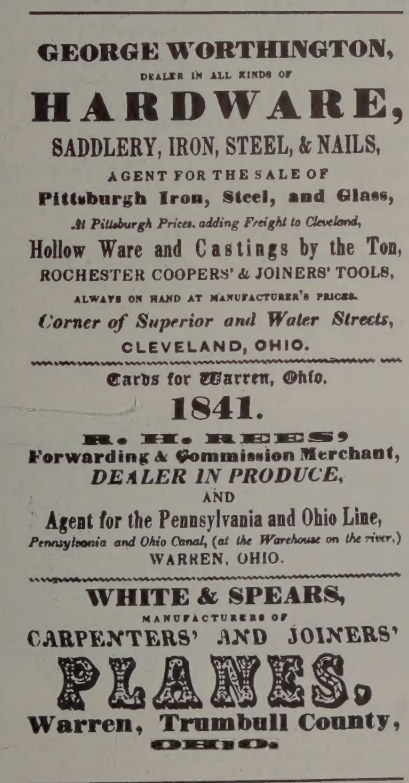
consider the present ectric refrigerator, an r a radio, as compared a few years ago, we see what straight-line ethods have done for articles have ceased and have come within us all. It must be made er, that these reduc- ng prices are a direct ced costs.

person who actually benefits by increased production is the buyer and not the manufacturer. This is true because the latter takes only his fair margin of profit regardless of what the selling price might be. In other words, if automobile manufacturers for example, continue to discover better methods of production the companies will not show more profit at the end of the year, but rather we who buy automobiles will buy them for less. I feel that this is one point which is vital to the problem at hand and which must be understood if industry is to be successful in this venture of educating the public.

I realize that putting this story across satisfactorily presents a tremendous problem. Perhaps statistics used in trade papers and newspapers, offering hard, practical examples in this regard might be the answer; however, I am sure that such statistics must be readily understood and very practical in nature. You can not apply theory to convince a man who is absolutely certain that the scarcity of blacksmith's shops is ample proof that the automobile has ruined the country. It is a difficult problem and one that will require much education before it is solved.

F. E. MOORE

President,
Mathews Conveyer Co.,
Ellwood City, Pa.



GEORGE WORTHINGTON,
DEALER IN ALL KINDS OF
HARDWARE,
SADDLERY, IRON, STEEL, & NAILS,
AGENT FOR THE SALE OF
Pittsburgh Iron, Steel, and Glass,
At Pittsburgh Prices, adding Freight to Cleveland,
Hollow Ware and Castings by the Ton,
ROCHESTER COOPERS' & JOINERS' TOOLS,
ALWAYS ON HAND AT MANUFACTURER'S PRICES.
Corner of Superior and Water Streets,
CLEVELAND, OHIO.

Cards for Warren, Ohio.
1841.
R. H. REES,
Forwarding & Commission Merchant,
DEALER IN PRODUCE,
AND
Agent for the Pennsylvania and Ohio Line,
Pennsylvania and Ohio Canal, (at the Warehouse on the river,)
WARREN, OHIO.

WHITE & SPEARS,
MANUFACTURERS OF
CARPENTERS' AND JOINERS'
PLANES,
Warren, Trumbull County,
OHIO.

■ In this reproduction of a page in the Pittsburgh directory of 1841 the seventh line shows that "Pittsburgh Plus" was already established, 98 years ago

"Pittsburgh Plus" Antique

To the Editor:

The attached photostat print from Harris' Pittsburgh directory for 1841 shows an interesting ad of George Worthington, Cleveland. You will note the quotation on Pittsburgh iron and steel at "Pittsburgh prices, adding freight to Cleveland."

This establishes the custom of pricing on Pittsburgh base back nearly 100 years ago.

C. J. PATERSON

President,
Paterson-Leitch Co.,
Cleveland

Modernization

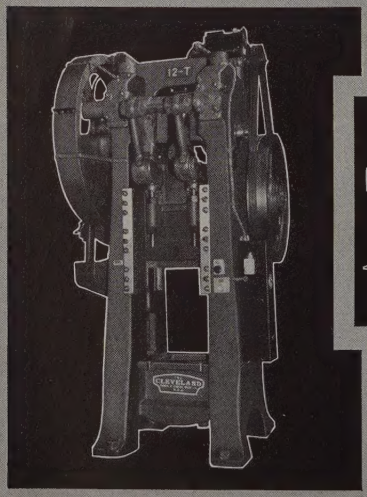
FIRST A
PROF

Progressive Manufacturers recognize the fact that modernization is the first aid to profits and take advantage of every opportunity to reduce costs and better their production facilities by installing *Modern* Presses which represent a great many important advances in efficiency, economy and precision.

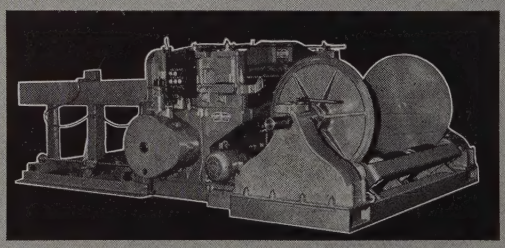
Cleveland Presses are built to give such service indefinitely. The superior design, materials, workmanship, careful inspection and thorough testing of the complete Machines assures equipment that will stand up under the most severe operating conditions, retaining their high efficiency throughout a
thereby keeping operating costs at a mi
you are contemplating a modernization p
connection with your Power Press Depar
services of our Engineers with their wide k
of Power Press design and application a
disposal.

The Cleveland Punch & Shear Work
3917 St. Clair Ave. Cleveland, O

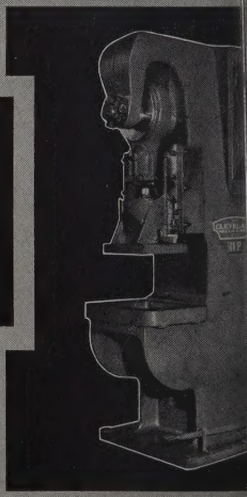
New York • Detroit • Chicago • Pittsburgh •



Cleveland Automatic cut-to-length Shear with Uncoiler, Five Roll Leveler and feed rolls. Capacity 78" wide stock, 16 gauge at 60 strokes per minute. Speed of feed—200 feet per minute.



Cleveland Single Crank Double Action Toggle Press equipped with electrically controlled hydraulically operated friction clutch.



Cleveland Punch Type Press equipped with non-repeat jaw clutch. The gearing and clutch run in oil and are enclosed in the frame.

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STEEL
ESTABLISHED 1882

Contents

Volume 104—No. 18 **May 1, 1939**

READER COMMENTS 9
AS THE EDITOR VIEWS THE NEWS 13
NEWS
Steel Industry's Financial Reports for First Quarter 15
Consumers' Earnings in First Quarter Up Sharply 16
Steelworks Operations for Week 17
Wiremakers in Regional Meeting 18
Coal Scarcity Affects More Blast Furnaces 18
Men of Industry 19
Obituaries 21
Activities of Steel Users and Makers 21
Open Hearth, Blast Furnace Groups Seek Better Operating Practices 22
Aviation 27
March Exports Gain 20 Per Cent 32
Meetings 33
New Steel Uses in Safety Liner 33
Tool Builders Base Confidence in Future on Peace-Time Activities 34
Westinghouse Order of Merit Awarded to 24 65
WINDOWS OF WASHINGTON 25
MIRRORS OF MOTORDOM 29
EDITORIAL—Businessmen Falter in Public Relations 36
THE BUSINESS TREND
Activity Index Reverses Recent Downward Tendency 37
Charts and Statistics 37-39
FORUM ON RE-EMPLOYMENT 40
TECHNICAL
Zinc-Dust Paints 42
Steel Engineers Inspect New Detroit Coke Plant 52
Automotive Valves 56
Surface Hardening Processes Reviewed by Ohio A.S.M. 71
Shear Fed from Storage Rack 72
PROGRESS IN STEELMAKING
Open-Hearth Bottoms 44
POWER DRIVES
Flat Belt Ratings 48
MATERIALS HANDLING
Preventing Scratches 54
JOINING AND WELDING
Tubular Furniture 58
STAMPING
High-Speed Press 64
HEAT TREATING
Cold-Finished Bars 68
INDUSTRIAL EQUIPMENT 74
MARKET REPORTS AND PRICES 81
The Market Week 82
BEHIND THE SCENES 94
CONSTRUCTION AND ENTERPRISE 102
INDEX TO ADVERTISERS 126

How Silico-Manganese improves Rimming Steel

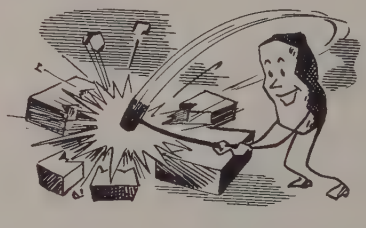
WHEN silico-manganese is added to rimming steel shortly before tapping, a cleaner, better steel is produced. The inclusions formed have appreciably lower melting points and are of a modified type. Results indicate that this modified type of inclusion decreases the age-hardening tendency of rimming steel. In addition, this silico-manganese treatment permits a reduction in the use of other deoxidizers that lead to objectionable inclusions.

Ask to have one of our metallurgists call and explain more fully the advantages of silico-manganese for producing rimming steel. He will gladly help make your use of this and other "Electromet" ferro-alloys more profitable, without obligation. Electro Metallurgical Company, Unit of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York, N. Y. In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

Items of Interest about other "Electromet" Ferro-Alloys

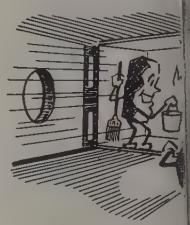
Vanadium Improves Steel Castings — The addition of a small amount of vanadium, usually not over 0.10 per cent, to steel castings refines grain, materially raises yield-point strength without sacrificing ductility, and greatly increases resistance to shock and fatigue. This is especially useful in engine and railroad car castings.

For Fine-Grained High-Chromium Steels, Use High-Nitrogen Ferrochrome—High-nitrogen ferrochrome adds nitrogen as well as chromium to high-chromium steels. Nitrogen in small amounts greatly refines the grain size of these steels, reduces objectionable grain growth at high temperatures, and materially increases strength and toughness. Machinability and corrosion resistance are retained.



Columbium Eliminates Quenching of Welded Austenitic Stainless Steel Equipment — When columbium is added to the austenitic stainless steels, a stable carbide is formed which makes the steel immune to intergranular corrosion. Hence columbium-bearing stainless steel equipment welded with columbium-bearing welding
be quenched from a
deg. F. to regain full
This eliminates a cost
ing fabricating step.

**For Cleaner Steel
Addition of Calciu
Silicon**—Calcium-man
as a final alloy additio
a cleaner, coarse-graine



hardening properties. Lo
of this combination all
merits for this purpos
nese-silicon is also being
to deoxidize all types
high-speed tool steels,
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**Zirconium Inhibits C
gation** — Zirconium add
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he Editor

s the News

JARTER earnings by 14 iron and steel hich control 85.6 of the country's y (p. 15) were $10,169,925. This com- loss of $3,788,575 in last year's first lmakers must become more cost-minded crease their profit margin as a due to whose investment makes possible the y, said E. G. Grace at Bethlehem Steel terly meeting. . . . Total net income of s in the metalworking field in the first 16) was more than double that of the nies in the first quarter of last year. . . . k for second quarter is less encouraging. tion again moved down last week and) is at 49 per cent of ingot capacity. ssion is expected.

• • •

ne continued coal mining tie-up scarcity et has had no serious effects in the metal nd metalworking industries. To conserve supplies, steel companies (p. 18) have banked some additional blast furnaces. . . . . In addition to thorough discussion of operating problems, last week's joint con- the open hearth, blast furnace and raw ommittees was featured (p. 22) by con- of matters affecting industrial relations. all grievances are simple matters in the s, it was said, and if handled properly advance to troublesome proportions. . . . announced for the forty-eighth general the American Iron and Steel institute e held in New York, May 25.

• • •

rtment (p. 26) has awarded the first six l" orders for war materials. . . . Out of of disastrous fires at sea, culminating in the huge loss of life on the MORRO CASTLE in 1934, finally has come a fireproof passenger ship. The PANAMA, first liner placed in service under the new safety specifica- bureau of marine inspection and naviga-), is characterized by new and extensive el. . . . Acute shortage of skilled labor (p. 27) confronts the various branches of our rapidly growing aviation industry. . . . Outstanding in the market (p. 82) is an inquiry for 150,000 tons of steel sheets for construction of air raid shelters in Europe. . . . The machine tool builders (p. 34) see fallacious public and legislative reasoning as on the wane and expect a good year.

• • •

A vast amount of employment could be created if cities, towns or trading areas sponsored the huge amount of building and rebuilding work that is necessary or desirable, says an authority (p. 40); private industry cannot undertake the promotional work involved . . . Due to a galvanic action similar to that exerted by galvanized zinc coats, zinc-dust paints deter rust formation; they have an important place (p. 42) in the maintenance of metal surfaces . . . An open hearth furnace with a more refractory bottom, designed for complete drainage so as to prevent injurious bottom boils (p. 44), showed a 48.4 per cent saving in installation cost and furnace time as compared with conventional construction. It made 19 heats in a week, averaging 8¾ hours from tap to tap, and 1543 gross tons per hour.

Building Necessary

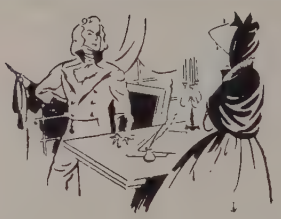
• • •

Now available is a new code (p. 46) covering overhead track systems . . . An improved method simplifies handling of wire rope in storage . . . Horsepower ratings of oak tanned, flat leather belting have been announced (p. 48) by the American Belting association . . . Interesting details feature new blast furnace and coke oven installations (p. 52) of Great Lakes Steel Corp. . . . by changing from manual to mechanical handling, a food display equipment manufacturer (p. 54) has eliminated scratching and bending of sheets in unloading and storage . . . A tubular furniture manufacturer has a technique (p. 58) whereby plated and polished parts are welded without damage to surfaces . . . A new system of oscillating die movement and press action (p. 64) offers smooth operation, long die life and high speeds.

Overhead Track Code

E C Kreutzberg

IT SHALL BE DONE



"Madame," said Talleyrand, "if it is possible, it shall be done—and if it is impossible, it shall be done!"

A polished phrase of a courtier and diplomat—but it is accurately descriptive of how Inland seeks to serve those who turn to us for counsel and service—and steel.

Serving an Inland customer means giving him *all* our usefulness—metallurgical research—personal cooperation—and, of course, a product suited to his needs, delivered when he wants it.

It's a service highly important to our customers because of its convenience and dependability.

INLAND STEEL C

38 South Dearborn Street, CHICAGO • District Offices: DETROIT • KANSAS CITY • MILWAUKEE • ST. LOUIS •

SHEETS . STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REI

s Meager Three-Months Profit 25.4%

Less Than in Fourth Quarter

N leading iron and
ers, representing 85.6
otal ingot capacity, re-
ings in the first three
year were $10,169,925,
cent lower than the
reported by the same
or the fourth quarter
n the first quarter of
producers incurred an
t loss of $3,788,575.
the experience of these
be typical, indicated net
the entire industry ap-
$11,880,000, or about
on the 9,506,594 tons
oduced. This compares
d earnings of $1.62 per
produced in the fourth
ear, and with a net loss
per ton of ingots made
arter of 1938.
ations for the industry
14 per cent of capacity
h quarter, down slight-
55.77 per cent average
h quarter 1938. In the
of 1938, operations av-
per cent.

xceeds New Business

Steel Corp.'s net profit
uarter was $2,409,059,
cents a common share
rred dividends. This
vith $3,658,160 net for
quarter of 1938, and
the first period of 1938.
declared a dividend of
7 per cent cumulative
d 25 cents on the 5 per
tive preferred, both pay-
o stockholders of record

ing on the outlook for
ier of the current quar-
race, president, said: "I
nything to indicate im-
nge in the steel busi-
way. I don't look for
to drop out of things,
any prospects for sharp
t. Rather, I look for a
age."

orders recently have
g behind production.
rated production for
was 59 per cent, Mr.

Grace said, while new tonnage was coming in at a rate of about 49 per cent.

Estimated value of orders on hand March 31 was $192,040,906, a new peace-time high, and represents some important shipwork. Orders on hand Dec. 31, 1938, totaled $162,774,713, and on March 31, 1938, $99,934,192.

"Steelmakers' Own Fault"

Automobile buying has been disappointing this year, Mr. Grace declared, adding the next important automotive buying probably would come about the end of May or early in June for 1940 models.

His attention was called to the concessions made on automotive steel earlier and to the relatively fine financial showing of automakers, as compared with steel earnings.

"If the steel industry can't make a profit on the steel it sells to consumers," he said, "it is its own fault —certainly not the consumers'."

Steelmakers must become more cost-minded—the essence of management, he added. Cost factors for the past nine or ten months have been relatively constant. Yet much tonnage booked within that period has been at lower prices. He indicated there is little that can be done to reduce costs that already has not been done by most companies. This, he emphasized, should be considered by producers in formulating their pricing and merchandizing policies.

Nine months ago, Mr. Grace said, Bethlehem's "break even" point was close to 35 per cent, possibly a shade higher; today, he figured, it is around 50 per cent.

It is plainly evident, he said, that the steel industry must increase its

Schwab Just 77—"No Important Change"

■ Chairman of Bethlehem Steel, who passed his seventy-seventh milestone April 18, attended the stockholders meeting last week, heard President Grace say, concerning the immediate outlook: "I don't see anything to indicate important change in steel business either way." Left to right: Mr. Grace, Mr. Schwab, and Hoyt A. Moore, New York lawyer. Wide World photo

Steel Producers' First Quarter Financial Summary

	First Quarter 1939	First Quarter 1938	Fourth Quarter 1938	Ingot Capacity gross tons
U. S. Steel Corp.	$660,551	$1,292,151*	$4,432,914	25,790,000
Bethlehem Steel Corp.	2,409,059	994,908	3,658,160	10,042,000
Republic Steel Corp.	532,899	3,062,564*	308,613	6,500,000
Jones & Laughlin Steel Corp.	376,525*	1,269,725*	1,147,506*	3,660,000
National Steel Corp.	2,426,669	1,088,635	2,753,156	3,400,000
Youngstown Sheet & Tube Co.	217,107	139,529*	90,108	3,120,000
American Rolling Mill Co.	793,479	197,310*	27,721*	2,669,520
Inland Steel Co.	2,024,601	923,076	1,759,785	2,760,000
Wheeling Steel Corp.	828,661	531,035*	1,042,153	1,750,000
Sharon Steel Corp.	7,613	151,090*	267,655	500,000
Continental Steel Corp.	279,178	55,208	228,000	325,000
Keystone Steel & Wire Co.	317,608	187,569	115,728	250,000
Wickwire Spencer Steel Co.	158,753*	331,916*	10,499*	150,000
Rustless Iron & Steel Corp.	207,778	62,651*	158,463	†35,700
Totals	$10,169,925	$3,788,575*	$13,629,009	60,592,220
FINISHING CAPACITY ONLY				
Acme Steel Co.	$339,671	$ 969	$202,726	.....
Superior Steel Corp.	6,773*	141,167*	.....	.....
PIG IRON CAPACITY ONLY				
Virginia Iron, Coal & Coke Co.	$ 36,811*	$ 28,064*	$ 22,847*	.....

*Loss. †Stainless steel ingots.

profit margin. This is due the stockholders whose investment makes possible the steel industry.

The corporation expects to spend about $10,000,000 this year on routine improvements and maintenance; no special expansion program is contemplated.

U. S. STEEL'S SHIPMENTS UP; NET INCOME DOWN

United States Steel Corp.'s net income applicable to capital stock amounted to $660,551 in the first quarter this year, compared with $4,432,914 for fourth quarter last year, and $1,292,151 deficit in the first quarter, 1938.

First quarter shipments totaled 2,235,209 tons, or 9.7 per cent more than the 2,037,144 tons in the previous quarter, and 42.8 per cent increase over first quarter, 1938, shipments of 1,565,244 tons. First quarter shipments amounted to 50.2 per cent of capacity, and production was at an average rate of 51.7 per cent of capacity.

Lower earnings despite improved operations, the corporation says, reflects the generally lower average level of prices realized without proportionately compensating adjustments in labor and material costs, which continue at the high levels of last year.

Although the corporation's shipments in the first quarter exceeded those of the last quarter of 1938, the increase was less than the normal seasonal expectation. This is considered not surprising in view of the expanding activity in the latter part of last year and the uncertain foreign conditions with which business recently had to contend.

Directors voted the regular quarterly $1.75 dividend on preferred stock, payable May 20.

Total net working assets, before deducting current dividend declaration: At March 31, $426,924,776; at Dec. 31, 1938, $426,984,023.

These amounts are calculated on basis of including in current liabilities capital obligations due within one year and excluding from current assets the rece... lectible within one y... justments have the ... ing the net current ... from that previously ...

Construction and ... ment expenditures i... were limited to comp... underway at the be... period and to main... Outlays for such wo... for property sold, wer... ly $3,600,000. At ... pended balance on a... priations for property ... betterments amounte... 000,000.

Employment and ... tics:

	Ave... Num... Emp...
First quarter, 1939	208
Fourth quarter, 1938	203
First quarter, 1938	211

NATIONAL EARNS... 37TH CONSECUTIVE...

National Steel Cor... ings for first quarter ... 668.79, equal to $1.10 a...

Consumers' First Quarter Net Profit Up

■ TOTAL net income of 73 companies among equipment m... suppliers and consumers in the first quarter aggregated $23,1... crease of 105.1 per cent over the $11,299,096 total income re... first quarter, 1938. STEEL's tabulation, April 24, page 19, incl... panies, while the following table lists 42. Only six of the ... reported a net loss last quarter, against 32 in the initial 193... figures are net income, except where asterisk denotes loss.

	First Quarter 1939	First Quarter 1938
Aetna Ball Bearing Mfg. Co., Chicago	$ 63,552	$ 929*
Allis-Chalmers Mfg. Co., Milwaukee	710 277	1,403,649
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.	2,577	40,404*
Bower Roller Bearing Co., Detroit	219,954	81.213
Briggs & Stratton Corp., Milwaukee	344,188	165,513
Budd Wheel Co., Philadelphia	135,506	195,961*
Campbell, Wyant & Cannon Fdry. Co., Muskegon	1,250	80,176*
City Auto Stamping Co., Toledo, O.	33,412*	4,186*
Clark Equipment Co., Buchanan, Mich.	243,791	26,210
Copperweld Steel Co., Glassport, Pa.	200,236	131,458
Diamond T Motor Car Co., Chicago	46,296	19,857*
Easy Washing Machine Corp., Syracuse, N. Y.	95,870	126,341*
E. G. Budd Mfg. Co., Philadelphia	101,389	256,912*
Electrolux Corp., New York	443,913	668,246
Ex-Cell-O Corp., Detroit	149,711	132,063
Florence Stove Co., Gardner, Mass.	106,333	47,370
Gardner-Denver Co., Quincy, Ill.	216,770	61,356
General Cable Corp., New York	196,773*	66,147*
Houdaille-Hershey Corp., Detroit	407,140	29,329
Hoskins Mfg. Co., Detroit	97,980	57,228
L. C. Smith & Corona Typewriters Inc., Syracuse	117,664	118,957
Link-Belt Co., Chicago	199,161	234,090
Master Electric Co., Dayton, O.	94.277	52,804
Marchant Calculating Machine Co., Oakland, Calif.	168,894	151,431
Marion Steam Shovel Co., Marion, O.	32,685*	106,115*
Minneapolis-Honeywell Regulator Co., Minneapolis	67.289	17,410*
Mullins Mfg. Corp., Salem, O.	94,840	135,086*
Nash-Kelvinator Corp., Kenosha, Wis.	140,505	2,185,657*
National Acme Co., Cleveland	53,836	189.951
Pittsburgh Coke & Iron Co., Pittsburgh	94,026	77,689
Reed Roller Bit Co., Houston, Tex.	406,445	420,648
Savage Arms Corp., New York	43,868*	50,123*
Seagrave Corp., Columbus, O.	26,405*	5,606
Signode Steel Strapping Co., Chicago	87,599	4,964*
Spicer Mfg. Corp., Toledo, O.	438,872	142,469*
Square D Co., Detroit	120,600	65,641
Stewart-Warner Corp., Chicago	146,275	215,166*
Studebaker Corp., South Bend, Ind.	56,914	1,072,352*
Thompson Products Inc., Cleveland	325,156	93,492*
Truscon Steel Co., Youngstown, O.	20,418	395,144*
United Aircraft Corp., New York	1,490,799	1,072,298
U. S. Hoffman Machinery Corp., New York	2,441	15,925*

standing shares. This
ith $1,088,635.50 net
o 50 cents a share, for
1938.

eriod marks the thirty-
ecutive quarter that Na-
has reported net earn-
dividends, since its or-
November, 1929.

**EEL'S EARNINGS
3 PER SHARE**

el Co., Chicago, reports
net profit in the first
s this year, equal to
on the 1,578,600 shares
Directors declared a
0 cents payable June 1
rs of record May 16.
er profits compare with
e first period last year,
5 in the fourth quarter

**STEEL EARNS
N COMMON**

Steel Corp. and subsidi-
consolidated net profit
r the first quarter, con-
a $531,035 net loss in
d last year.
er earnings are equal,
l requirements on 351,-
$5 prior preferred and
of 6 per cent preferred,
share on 563,637 out-
mon shares.

VN SHEET & TUBE

n Sheet & Tube Co.,
O., reports $217,106.64
first quarter, compared
in the preceding period,
of $139,529 in the first

operations before pro-
pletion of minerals and
iation, but after pro-
timated federal income
2,687,210.50; other in-
5.09. Interest charges
2.77; provision for de-
depreciation, $1,670,-
charges, $158,736.07.

Y LUDLUM

Ludlum Steel Corp. re-
come for first three
year was $206,582. This
been omitted from the
producers' earnings
e comparable figures
riods are not available.
teel Co. and Ludlum
rged in August, 1938.

DECLARED

Alloys Steel Co., Pitts-
ts on common, payable
cord May 20. Previous
60 cents on March 2,

el Products Co., Cleve-
3 per cent cumulative

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended April 29	Change	Same week 1938	1937
Pittsburgh ..	43	None	26	90
Chicago	49.5	— 4	33.5	85.5
Eastern Pa...	37	— 1.5	27.5	70.5
Youngstown..	43	None	29	87
Wheeling	63	— 2	46	88
Cleveland ...	39	+ 2.5	32	79.5
Buffalo	37.5	— 9	28	93
Birmingham..	55	— 5	66	83
New England	43	+ 8	27	93
Cincinnati ...	52	+ 6	30	90
St. Louis.....	42	— 2.5	36.3	94
Detroit	59	+ 2	18	100
Average....	49	— 1.5	32	91

first preferred, 50 cents on non-cumulative preferred and 50 cents on common. All are payable July 1 to record June 16. First quarter net profit totaled $540,966.

A. M. Byers Co., Pittsburgh, $1.75 and interest of 46 2/3 cents on arrearages on the preferred stock, payable June 1 to record May 10.

Copperweld Steel Co., Glassport, Pa., 20 cents on capital stock, payable June 10 to record June 1. In the previous quarter 40 cents was paid on stock which has since been split two for one.

United Engineering & Foundry Co., Pittsburgh, 50 cents on common, payable May 16 to record May 5. Same amount was paid Feb. 14.

STEEL INDUSTRY'S LOSS $14,879,000 IN 1938

The steel industry incurred a net loss of $14,879,000, after all charges but before dividends, in 1938, according to the American Iron and Steel institute, which compiled reports from nearly 100 companies representing more than 90 per cent of capacity. In 1937, the same companies earned $228,276,000.

Last year was the fifth since 1930 in which the industry operated at a loss, 1935, 1936 and 1937 being the exceptions. The industry's return on investment since 1930 has averaged only 1.2 per cent.

Total payrolls of the companies last year, including some subsidiaries which do not produce iron or steel, amounted to $730,367,000, against $1,118,131,000 in 1937. This decrease was less than 35 per cent, against declines of 92 per cent in earnings before interest charges and of 44 per cent in steel production.

Dividends to 519,000 stockholders in reporting companies were 76 per cent lower than in 1937. The total of $48,952,000 in dividends represented a return of 2 per cent on value of common and preferred stocks outstanding, while dividends of $149,448,000 in 1937 were equivalent to a return of 5.7 per cent.

PRODUCTION

■ STEELWORKS operations last week declined 1.5 points to 49 per cent, lowest since mid-October, except for the final week in December. Reductions were noted in six districts, advances in four and two were unchanged. A year ago the rate was 32 per cent.

Youngstown, O.—Steady at 43 per cent, 38 open hearths active. The same rate is scheduled this week.

Chicago — Down 4 points to 49.5 per cent after four weeks at 53.5 per cent. Carnegie-Illinois Steel Corp. has taken off a blast furnace at Gary, and one at South Works.

Cincinnati — Increased 6 points to 52 per cent through relighting of open hearths recently threatened by high water.

St. Louis—Receded 2.5 points to 42 per cent, as result of smaller open hearths being operated.

Detroit — Up 2 points to 59 per cent, resulting from change to open hearths of larger capacity by one producer.

Pittsburgh—Held at 43 per cent, starting the week higher but tapering at the close.

Wheeling—Smaller production at one plant resulted in 2 points reduction to 63 per cent.

Central eastern seaboard—Loss of 1.5 points to 37 per cent, with further contraction this week as two interests will drop one open hearth each.

New England—Advanced 8 points to 43 per cent, one open hearth being added. The same rate is scheduled this week.

Buffalo — Down 9 points to 37.5 per cent as four furnaces were taken off.

Birmingham, Ala. — Dropped 5 points to 55 per cent. Eleven open hearths are in production. One blast furnace has been banked.

Cleveland—Increased 2.5 points to 39 per cent, with only slight change indicated for this week.

50th Year for Heppenstall

■ Fiftieth anniversary of the Heppenstall Co., Pittsburgh, was observed last week at the company's Bridgeport, Conn., plant by honoring Chairman C. W. Heppenstall for 46 years' service and by presenting service medals to other veteran workers.

Feature of the ceremonies was the unveiling by President Charles S. Lindsay of a bronze plaque bearing Mr. Heppenstall's likeness and the names of veteran employes. A. J. Porter Jr., general manager at Bridgeport plant, presented service medals to those with 25, 20, 15 and ten years' service.

Coal Stringency More Pronounced

■ EFFECTS of the suspension of operations since April 1 at most of the country's bituminous coal mines became apparent last week.

Steel producers and railroads have been the principal sufferers from the tieup, the latter not only from the dwindling of supplies of fuel, but also loss of coal traffic. As a result several roads have closed their shops or have laid off a number of employes.

Curtailment of shop activity in turn has affected steel orders. In addition, steelworks have taken further steps to conserve coal and coke by banking blast furnaces or reducing blast. Coke oven operations also have been slowed at some plants. Between 10 and 15 blast furnaces have been banked the past two weeks, although the decline in steel business was responsible for a part of the suspension.

Supplies for Several Weeks

In certain districts coal and coke reserves are regarded ample for several more weeks' requirements and a few steel companies express no concern over appearance of an acute shortage prior to settlement of differences between operators and miners.

According to the bureau of mines, a 35-day coal supply was above ground April 15, although the tonnage was not evenly distributed and would require reallocation to last through the indicated period.

Possibility was seen that coal might be shipped from docks at the head of the Great Lakes to lower ports, a reversal of the usual trend at this period with the opening of navigation. Northern stocks are larger than usual, because of the recent mild winter.

Another possible development of a reverse order is that the national bituminous coal commission, created primarily to fix minimum coal prices, might step in to prevent prices from skyrocketing in the event the mine shutdown became prolonged.

In the meantime the federal labor department continued its efforts to negotiate a settlement between representatives of miners and operators, with no definite results reported late last week.

5000 AT COAL CONVENTION; $2,000,000 IN EQUIPMENT

Five thousand delegates attended the sixteenth annual coal convention and exposition of the American Mining Congress in Cincinnati last week. The exposition featured $2,000,000 worth of mining equipment.

Federal regulations, mechanization and accident prevention were recurring subjects in the formal program, while informally there was considerable discussion of labor difficulties now proving a barrier to the industry.

The manufacturers' division elected these officers: Chairman, Frank E. Mueller, vice president, Roberts & Schaefer Co., Chicago; first vice chairman, Arthur S. Knoizen, Joy Mfg. Co., Franklin, Pa.; second vice chairman, E. J. Burnell, Link-Belt Co., Chicago; third vice chairman, E. F. Carley, E. I. du Pont de Nemours Co., Wilmington, Del.

Allis-Chalmers To Build New Plant at Pittsburgh

■ Contracts for a new transformer plant in Pittsburgh, to be known as the River plant, have been let by Allis-Chalmers Mfg. Co., Milwaukee.

Plant will be 416 x 144 feet; will cost, with buildings and equipment, about $378,000; and will be operating about Aug. 15.

In design, plant will represent the latest manufacturing methods as applied to the production of distribution transformers. It will be set up on a line production basis—raw material coming in at one end and a finished product going out at the other—and will generally increase efficiency.

General contractor is H. M. Siesel Construction Co., Milwaukee and Pittsburgh. Contracts for the steel work were awarded to Bethlehem Steel Co.

Chrysler Plans Expansion Of California Plant

■ Extensive modernization and improvement program for the Los Angeles plant of Chrysler Corp. will be undertaken shortly.

This includes installation of entire new rustproofing and finishing equipment, new material handling equipment, extensive rearrangement and modernization of the passenger car and truck assembly lines, new concrete receiving and shipping docks, two large additions to the plant, paved parking lot for employes, half a mile of concrete road on company property, and new gate house.

The new enameling department will house rustproofing and spraying equipment and drying ovens; spray rooms will be completely air-conditioned. Wiring machines, welders, punch presses, metal finishers and conveyors will be required.

Wiremaker Regional M

■ FIRST New Engl meeting of the Wire a Worcester, Mass., Apr tended by 100 associa wire manufacturing in meeting included a vis ton Co., where relation to the industry was emp a dinner featuring tw papers. R. R. Tatnall, Wickwire Spencer Steel ter, and chairman of th mittee, presided at eve

Importance of re stressed by M. F. Bee research director. The oratory, he said, has a tion in servicing pro sales departments in ad veloping new facts by ter processing of mater possible. The successf worker must ever be somewhat fault-findin Beecher's opinion.

Describes Company's

He described the pro search maintained by h in which is involved dev new materials and imp those already in use. N bats 100 per cent, he de technical procedure be nation of logical thought technical tools, including ing and background.

C. G. Johnson, assista of mechanical engineeri ter Polytechnic institut use of the microscope in Admitting that while valuable progress has be utilization of this inst feels considerable rem done. Metallurgists st from knowing much a lography in the wir

Prof. Johnson pointed fundamental facts can be with a relative degree by use of the microscop plasticity, making rollin possible, carbon content pearlite, oxidation, crys tion in work hardening treating.

F. A. Westphal, superi wire mills, Sheffield S Kansas City, Mo., and p the Wire association, regional meetings now the organization's progr ard E. Brown, executive Stamford, Conn., comme relationship of the wir and the association, ass more and more control in try will pass to metallu technical men.

N OF INDUSTRY

KIMBALL, the past four
ive vice president, Car-
Steel Corp., has been
xecutive vice president,
s Steel Corp. of Dela-
offices in Chicago. For-
cement was made by
ess, president, United
Corp., at a luncheon last
n the Blackstone hotel,
nded by officers and di-
ne corporation and sev-
civic and business lead-

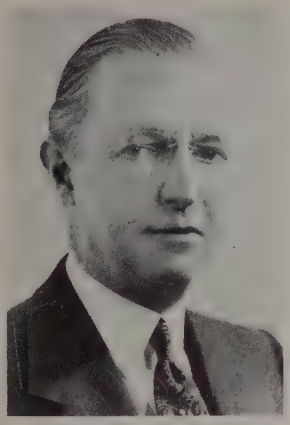
notion gives recognition
tance of Chicago in the
ation organization, mills
go district representing
r cent of its capacity,
rea capacity being only
er.

all has been associated
States Steel subsidiaries
starting in the engineer-
ment of American Tin
rom 1905 to 1931 he was
er of American Sheet &
o., then being elected a
nt and director of that
He is a director of Car-
s Steel Corp., president
Steel Co. and Gary Land
irector of Illinois Manu-
ssociation. He is a mem-
American Iron and Steel
d numerous civic organ-

♦

Stilwell has been elected
Warner & Swasey Co.,
ucceeding the late Philip
Clifford S. Stilwell,
s been made executive
nt, and L. D. McDonald,
easurer, has been named
nt.

duation from Denison
n 1910, Charles Stilwell
employ of Warner &



G. Cook Kimball

Swasey as a machine operator. In 1911 he was transferred to the sales department, rose rapidly to the position of district manager at New York. In 1914 he was European representative, five years later was export sales manager. He became general sales manager in 1922, and in 1929 vice president and a director. Mr. Stilwell served as president of the National Machine Tool Builders' association in 1934.

Clifford Stilwell graduated from Denison in 1912 and joined Warner & Swasey as a special apprentice. In 1913 he was salesman in Chicago territory, and a year later was district manager at Detroit. He became general sales manager in 1930, a director in 1934 and vice president in 1935.

♦

Col. Frank A. Scott, Cleveland, has been appointed to the executive committee of Youngstown Sheet & Tube Co., Youngstown, O., to serve during the illness of H. G. Dalton, board chairman.

♦

Eugene D. Hopper has been elected a director, Aetna-Standard Engineering Co., Youngstown, O.

♦

Vincent Cada, Eaton Mfg. Co., Cleveland, has been elected president, Purchasing Agents Association of Cleveland Inc.

♦

G. M. Bowen has become acting president of Ross Operating Valve Co., Detroit, following the death of C. A. Ross, founder and president.

♦

A. N. Snyder, Wohlert Corp., Lansing, Mich., has been elected president, Purchasing Agents Association of Central Michigan.

♦

F. J. Beckley, treasurer and assistant secretary, L. A. Young Spring & Wire Corp., Detroit, has been elected a director.

♦

Hugh W. Hitchcock has been appointed advertising manager, Packard Motor Car Co., Detroit. He was assistant advertising manager since 1933.

♦

Alfred Marchev, works manager and chief engineer, Signode Steel Strapping Co., Chicago, has been elected a director, replacing H. C. Porter, resigned.

♦

Richard L. Gridley has resigned as financial editor, *Pittsburgh Press*, to join the public relations department, Pittsburgh Plate Glass Co., Pittsburgh.

♦

David D. Moffat, vice president, Utah Copper Co., Salt Lake City, Utah, has been elected chairman, western division, American Mining congress.

♦

J. L. Fife, of Seminole, Okla., secretary of the Oklahoma Waste Trade Association Inc., has been elected mayor of the city of Seminole.

♦

Joseph A. Martz, formerly an account executive with the Buchen Co., Chicago, is now engaged in customer relations and research work for Studebaker Corp., South Bend, Ind.

♦

A. G. C. Quay has been appointed Cleveland district representative, Moltrup Steel Products Co., Beaver Falls, Pa., in charge of the company's new office at 1199 Union Commerce building, Cleveland.

♦

A. D. Sheere has been named manager, Houston, Tex., division, A. M. Byers Co., Pittsburgh. He formerly was located in Atlanta, Ga., as as-

Stilwell

Clifford S. Stilwell

L. D. McDonald

sistant manager of the Pittsburgh division. W. B. Simpson, formerly sales representative in the Pittsburgh division's northern territory, has been appointed assistant division manager to succeed Mr. Sheere, with headquarters in Atlanta.

♦

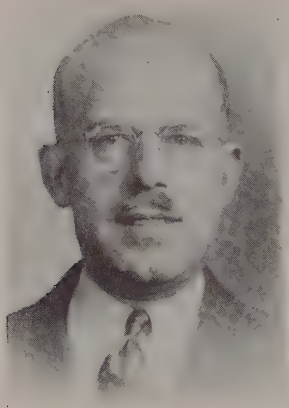
J. E. Buckingham, formerly vice president, Lincoln Electric Railway Sales Co., Chicago, has been appointed vice president, Portable Plating & Equipment Co., Chicago, in charge of all railway sales.

♦

Frank L. Hayes, formerly with Chicago Hardware Foundry Co., Chicago, has joined the sales force of Michigan Smelting & Refining Co., and will be located in the company's Chicago office.

♦

Murray H. Edelman has been appointed general export sales manager, Manning, Maxwell & Moore Inc. of New York. Mr. Edelman joined the company in 1910, and the past five years was export sales manager, mill supplies division, Jersey City, N. J. All export sales have been consolidated into one department.



Murray H. Edelman

♦

J. Alfred Curtis, formerly control chemist, Basic Dolomite Inc., Maple Grove, O., has joined the staff of Battelle Memorial institute, Columbus, O. He has been assigned to the analytical laboratory.

♦

Frank B. Warren, vice president in charge of sales, Bessemer Limestone & Cement Co., Youngstown, O., has been elected a director, replacing William R. Daly, of Cleveland, who declined to be renominated.

♦

H. L. Hildenbrand, the past five years associated with the Pittsburgh office of Esterline-Angus Co., maker of recording instruments, Indianapolis, has been named representative in the New York metropolitan area.

♦

Horace C. Flannigan, senior vice president, Manufacturers Trust Co. of New York; Georges Doriot, assistant dean, Harvard Business school, and Charles E. Richardson, of Bryn Mawr, Pa., have been elected directors, McKeesport Tin Plate Co., McKeesport, Pa.

♦

Walter Erman, Erman-Howell & Co. Inc., Chicago, and Louis J. Borinstein, Indianapolis, have been appointed chairman and vice chairman, respectively, public relations committee, Institute of Scrap Iron and Steel Inc., New York.

♦

A. W. F. Green, formerly associated with the Allegheny Ludlum Steel Corp., Pittsburgh, resigned April 15 to become research metallurgist with the Pratt & Whitney Aircraft division, United Aircraft Corp., East Hartford, Conn.

♦

Donald D. Hogate, in charge of the Detroit office, General Motors' public relations department, has been transferred to the staff of William S. Knudsen, president, to develop intercity communications of the corporation. Felix Bruner, assistant in the department, succeeds Mr. Hogate.

♦

Peter J. Muller has been named group leader in charge of cost study in the industrial engineering department of Carnegie-Illinois Steel Corp.'s Gary works. Mr. Muller goes to Gary from the corporation's South works where he began as a water boy in 1917. After serving in various capacities in the blast furnace department until 1937, he was made a junior industrial engineer; a year later was appointed to the post of industrial engineer.

♦

Garrett A. Connors has been elected vice president in charge of industrial relations, Pittsburgh Steel Co., Pittsburgh. He will continue in similar capacity with Sharon Steel Corp.

New members of the executive committee of Pittsburgh Steel are: Joseph H. Carter, vice president in charge of operations and Albion Bindley, purchasing agent. Other members who will continue to serve are: Henry A. Roemer, J. H. Hillman Jr. and Theodore W. Friend.

♦

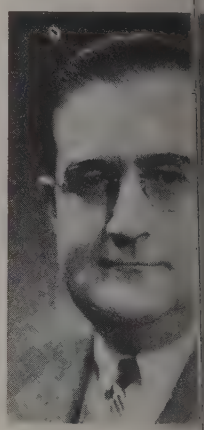
Fred T. Llewellyn, research engineer, United States Steel Corp. of Delaware, Pittsburgh, addressed the Washington section, American Welding society, April 24, on "Seventy Years in Retrospect." Mr. Llewellyn, a past president of the Welding society, expects to retire June 1 after nearly 50 yea[r] the corporation. He h[as] in structural steel w[ork] ments. Born in Wale[s] at the University of [Wales] Llewellyn came to t[he] 1890, taking a position with a Midwest steel c[o.] later became a part of [the] Bridge Co., a Steel co[m]pany subsidiary.

♦

Harry Glaenzer, vice[-]charge of engineering [of] comotive Works, has [been] of his duties in connec[tion] tive management of t[he] Eddystone engineering [di]vote all his time to [the] in the field of railway [lo]er. Ralph P. Johnso[n] charge at Eddystone, [as] of chief engineer. Cha[rles] and E. J. Hartley ha[ve] pointed assistant chief[s]

♦

John Storm has be[en] New York district sa[les] Carborundum Co., N[ew]

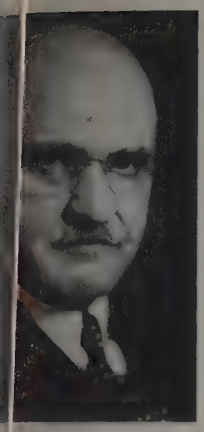


John Storm

N. Y. His headquarte[rs] the company's branch [in] and sales offices, 601 W[est] sixth street, New York. [He] succeeds Frank J. Har[ris] has been transferred to [the] partment at Niagara [Falls] Storm previously had b[een] ber of the Detroit sales

♦

F. G. Schranz, who r[ecently] named general manag[er] Southwark Corp., has be[en] in the engineering and [hy]draulic and special m[ach]years. Completing his [ap]ship as a machinist and [his] training as a graduate [in] and electrical engineer i[n] started in 1904 as a ma[in] the Midvale Co., Philade[l]sequently he joined the C[ra]Works of R. D. Wood & [Co.] signing engineer. In [1]



F. G. Schranz

ated with Southwark Machine Co., serving as it in charge of sales and then as sales manager r for the Southwark di- Southwark was ac- he Baldwin Locomotive 929. A year later I. P. LaVergne Inc., and the ne Engine Co. were in- Southwark in the incor- Baldwin-Southwark Corp.

♦

enstermaker, president, Baker Co., Indianapolis, president, Concrete Re- eel institute, Chicago, at annual meeting in For- otel, Augusta, Ga., April ge W. Connors Jr., presi- ers Steel Co., Birming- was elected a vice presi- F. Curley, vice president, eel Co., New York, and rdon, Joseph T. Ryerson Chicago, were re-elected ent and treasurer, re- New directors are: Blair president, Virginia Steel nd, Va.; H. G. Daley, Sweets Steel Co., Wil- a.; F. H. Sparks, Knox- o., Knoxville, Tenn.; W. manager of sales, rein- sion, Truscon Steel Co., , O.; H. E. Calves, vice aylor-Davis Inc., Phila- e-elected); Ralph T. stant manager of sales, ghlin Steel Corp., Pitts-

S S. BOARDMAN, con- neer, specialty sales di- egie-Illinois Steel Corp., in Pittsburgh, April 19. r. Boardman invented d a new type of inter- which was adopted by ent to raise the battle-

ship MAINE in Havana harbor, and later was used in major construction work. He was designing and construction engineer with the Lackawanna Steel Co. in 1901 when it started to build its plant at Buffalo, and upon its completion became affiliated with Conkling & Boardman, consulting engineers. He returned to Lackawanna Steel in 1913, remained there until 1923 when he became vice president and manager of sales, Strong Steel Foundry Co., Buffalo. Prior to joining Carnegie-Illinois early in 1938 he was consulting engineer, Jones & Laughlin Steel Corp., Pittsburgh. Mr. Boardman was a member, American Society of Civil Engineers and Engineers' Society of Western Pennsylvania.

♦

Horace Andrews, 77, well-known corporation lawyer, in Cleveland Heights, O., April 27. He was senior partner in the firm of Andrews, Hadden & Putnam, a veteran of more than 40 years legal practice in Cleveland. He was counsel for Pickands, Mather & Co., Cleveland-Cliffs Iron Co., M. A. Hanna Co., and many other companies identified with the iron and steel industry.

♦

William A. Baker, 63, vice president and sales manager, American Electrical Heater Co., Detroit, in that city, April 20.

♦

Chester T. Ayres, 65, executive treasurer, Union Carbide & Carbon Corp., New York, April 6 in Montclair, N. J.

♦

Howard Ross Warren, for 30 years treasurer, Sheffield Steel Corp., Kansas City, Mo., at his home in that city, April 19.

♦

H. C. Herpel, 57, manager of industrial relations, National Tube Co. at McKeesport Pa., in McKeesport, recently.

♦

Robert A. Flanagan, 46, manager, Philadelphia branch of Lansing Co., Lansing, Mich., in Brookline, Pa., April 11. He had been with the Lansing company in various capacities since 1908.

♦

W. H. Jackson, 71, president, Pittsburgh-Des Moines Steel Co., Pittsburgh, in that city, recently. Born in Delaware, O., Mr. Jackson went to Pittsburgh about 30 years ago, and had been president of Pittsburgh-Des Moines 17 years.

♦

J. A. Roesch Jr., 55, president, Steel Sales Corp., metal jobbing firm, Chicago, in Pittsburgh, April 27. Well known in the steel industry, Mr. Roesch was also a director, Copperweld Steel Co., Glassport, Pa., since its formation in 1917.

Activities of Steel Users, Makers

■ SUTTON Engineering Co., Bellefonte, Pa., recently demonstrated to a large group new units it has developed for use in descaling, sizing, straightening and polishing work. Descaling machine obtained good results with a mixture of carborundum and stainless steel grindings as the abrasive. During tests, 1 11/16-inch rounds were held to 0.002-inch plus or minus as to size and straightness.

♦

Consolidation of Speeder Machinery Corp., Cedar Rapids, Iowa, manufacturer of excavating and materials handling equipment, and the shovel division of Link-Belt Co., Chicago, has been announced by Alfred Kauffmann, president, Link-Belt. Speeder Machinery Corp. will be operated as a Link-Belt subsidiary, with the present management in charge, T. M. Deal continuing as president.

♦

H. H. Robertson Co., Pittsburgh, has moved its executive, general sales and Pittsburgh sales offices from the Grant building to the twenty-fourth floor of the Farmers Bank building in Pittsburgh. All other departments, connected with production, were moved to the company's new office building at its plant in Ambridge, Pa.

♦

Wm. B. Scaife & Sons Co., Pittsburgh, has established an industrial fellowship at Mellon institute, Pittsburgh, for research in processes of fabricating and use of metal tanks, pressure cylinders and water-softening equipment. Dr. H. L. Anthony III is incumbent of the fellowship.

♦

Wickwire Spencer Steel Co. has opened its new $500,000 wire mill on River road, Buffalo, with operations on a restricted basis. Capacity operations will not be possible for six months or a year.

The company's plant in Worcester, Mass., will be closed and employes and machinery transferred to the new 399 x 500-foot building in Buffalo. Products will include fencing, highways reinforcements, wire fabrics.

♦

Schiavone-Bonomo Corp., Jersey City, N. J., dealer in scrap, marked its fortieth year in business April 24 by occupying its new office building at the foot of Jersey avenue. All office and administrative departments, formerly divided between New York and Jersey City, will be centralized.

Open Hearth, Blast Furnace Groups Seek Better Operating Practices

■ ALL RECORDS for attendance were broken at the national conference of the Open Hearth, and Blast Furnace and Raw Materials committees, American Institute of Mining and Metallurgical Engineers, at Hotel Cleveland, April 26-28. The open-hearth group was represented with more than 365 members, including 80 open-hearth superintendents and their assistants and 50 metallurgists; the blast furnace group totaled more than 100.

Except for one joint session, the two committees conducted separate meetings. Leo F. Reinartz, manager Middletown district, American Rolling Mill Co., Middletown, O., is chairman of the Open Hearth committee; and Ralph H. Sweetser, consulting engineer, New York, is chairman of the Blast Furnace and Raw Materials committee. The two groups also participated jointly in a visit to the 98-inch continuous strip mill of Republic Steel Corp. on April 27, and in a dinner in the evening.

Mr. Reinartz announced the serious illness of F. B. McKune, superintendent of open hearths, Steel Co. of Canada Ltd., Hamilton, Ont.—a steelmaker held in high esteem both in this country and Canada.

Chairman Reinartz also reported that two questionnaires had been sent to various steel companies this year, one dealing with burners for oil and natural gas fired furnaces, and the other with standardization of men's blue glasses. Replies indicate that a good cross section of the steel industry has been obtained.

Procedure in Grievances

Speaking on "Settling of Grievances," R. A. Chaffin, director of industrial relations, Continental Steel Corp., Kokomo, Ind., emphasized importance of avoiding grievances. Practically all grievances are simple matters in the first stages, he contended, and if proper methods of investigation and correction are used, few which will advance to troublesome proportions. The speaker advocated proper training and instruction for supervisors, including the lower groups. The latter should be taught to investigate thoroughly and without prejudice all complaints and to withhold decisions until they are positive of their answers.

Experience has convinced the speaker that how the company deals with a problem often is more important than what it actually does. In the author's opinion, it is a good plan to have frequent sessions for foremen where they may discuss problems which may be divided into several sub-topics. Foremen are asked to prepare short papers on these topics and then considerable time is devoted to open discussion on the main subject, the sub-topics, and statements made by persons who compiled the papers. Speakers for the meeting are considered authorities on their subjects and are given an opportunity to answer questions resulting from discussion.

Must Maintain Confidence

Complete information, including complaint and investigation reports should be made in writing and signed. This, he stated, will usually provide proper basis for fair conclusions. Signed reports should not be shown to other people, the speaker warned, nor disclosed by the investigator.

In conclusion, Mr. Chaffin stressed the following fundamentals on the handling of grievances: Do everything possible to find and correct objectionable conditions before they are brought to attention by collective bargaining machinery; provide supervisory agents with proper information regarding company policy and with proper training in methods of discussing complaints with employes; be certain answers are not given hastily; impress supervisors with importance of properly settling complaints at their source; consider the advantages of having supervisors delay positive answers to complaints for at least a few hours so that they may check their original convictions and decide the type of explanation and reasoning which will be most satisfactorily accepted by those who have made the complaint; avoid unnecessary delay in either correcting a condition about which a complaint has been raised, or in presenting satisfactory explanation of reasons for delay or refusal; reduce to writing as completely as possible all reports and agreements; try to view the complete facts regarding a complaint in the same manner an impartial agent would see them and make the decision which he might be expected to give.

An operator in the Chicago district pointed out that his plant is divided into 20 sections, the open-hearth department having two delegates. If employes have a grievance, they take it to these two delegates and if the latter cannot arrive at a settlement, then the grievance is taken to the [illegible] the foreman and deg[illegible] come to a settlement, is taken to the depa[illegible] intendent. In case th[illegible] settlement, the matte[illegible] the superintendent of [illegible] lations, thence to the [illegible] justment comprising [illegible] who meet with the ge[illegible] tendent of the plant f[illegible] Many of the grievance[illegible] never get to the highes[illegible]

At a plant in the P[illegible] trict identified with t[illegible] plaints arising in the o[illegible] partment are brought [illegible] man in writing. If a se[illegible] not be made, the griev[illegible] to the open-hearth su[illegible] then passed to the supe[illegible] industrial relations an[illegible] the works manager.

At another plant, a[illegible] are dealt with through [illegible] nels. Monthly meetin[illegible] with the CIO, discussio[illegible] fined to those grievance[illegible] not be settled by depar[illegible]

Reduction [illegible] In Slag Vol[illegible]

Solution loss, slag v[illegible] operating practice were [illegible] sessions of the Blast [illegible] Raw Materials sessio[illegible] with the slag problem [illegible] at South works, Car[illegible] Steel Corp., Chicago, G[illegible] division superintendent [illegible] naces, pointed out th[illegible] slag above the tuyeres [illegible] the same as below the t[illegible] a compromise usually i[illegible] In a detailed study of [illegible] istry, he emphasized t[illegible] fluence this factor exe[illegible] action. For instance, a [illegible] only 2 per cent in silica [illegible] produce a 200-degree [illegible] ence in the melting p[illegible] slag, an important feat[illegible]

Mr. Steudel recomme[illegible] ing slag volume to ir[illegible] mina content. This, in [illegible] the melting temperature[illegible] tive to variations in ch[illegible] position. About 16 pe[illegible] mina is used here com[illegible] the usual 11 to 14 per [illegible] have successfully reduc[illegible] ume of slag in tests to [illegible] in basic furnaces wher[illegible] lowest previously mad[illegible] semer practice, 730 pou[illegible] tained where the previou[illegible] was 950.

These reduced volume[illegible] companied by significant[illegible] in coke consumption. In[illegible] tice, it was found that t[illegible]

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tailed discussion of heat balances obtained with various reduction methods and compared conclusions of previous investigators with those obtained by modern methods of attacking the problem. It was shown how direct reduction possibly had the greatest efficiency, at the same time reducing carbon consumption. The main conclusion was that carbon efficiency is promoted by direct reduction. He also pointed out that blast heat reduces carbon requirements to a greater degree than would be indicated by added heat content of the blast due to interlocking chemical and thermal reactions.

Discussion brought out that some operators had found best coke practice was obtained at relatively low blast temperatures while others were using temperatures up to 1700 degrees Fahr. and contemplating use of 1800. Referring to direct reduction, one commentator substantiated the conclusion that a certain amount of direct reduction was essential for a low coke rate. It was thought each furnace strikes a balance as to proportion of direct reduction it will maintain, this being increased by correct type of coke, uniform flow of material to bosh, proper peripherial distribution of the gas stream.

A paper contributed by J. A. L. Ortlepp, African Metals Corp., Johannesburg, Africa, suggested dividing blast furnace operations up into separate parts, believing that added economy could be obtained by producing a partial reduction in equipment outside the blast furnace. He advocates use of combined sintering and calcining equipment ahead of the blast furnace, the output of this equipment being discharged while still hot into the modified blast furnace. Advantages claimed include halving coke cost—by lowering the CO ratio, saving 64 pounds; pre-reduction of 90 per cent of iron oxide outside the furnace, saving 361 pounds; external calcination of fluxes, saving 81 pounds. Other advantages are said to be easy chemical control of process and elimination of much blast furnace trouble.

However, in the discussion following this paper, it was pointed out that the total fuel consumption was not reduced but that simply other cheaper fuels were substituted for coke. Much doubt was expressed as to reaction velocity being sufficiently high to afford commercial operation of such an arrangement. Also, the influence of solution loss, instead of increasing CO ratio, may actually decrease it because of added reactions occurring after the CO is formed.

Savings May Be Reduced

Other commentators saw no point in cutting the blast furnace in two, especially as any other arrangement must at least equal the high thermal and chemical efficiency of the blast furnace. Added handling costs also may offset any saving in fuel cost.

A paper contributed by Alfred Musso, consulting engineer, New York, described a low-temperature vacuum reduction process. Instead of pressure to hurry up reduction, he advocates use of a vacuum, advantages claimed being increased speed of reduction, elimination of undesirable gases and vapors which lead to objectionable secondary reactions in usual reduction methods. Operations involve heating the ore to a temperature of 1800 degrees Fahr. in a sealed chamber where it mechanically contacts carbon. This is followed by separation in an alkaline bath, also under a vacuum. He claims 99.5 per cent reduction with precise control and only 40 per cent of usual fuel consumption.

Discussion emphasized that these claims were based on highly theoretical studies with no practical plant in operation to demonstrate. Probable extremely slow speed of reaction was thought to preclude commercial operation. Also doubt was expressed at practicability of transferring such high heat values through the walls of a chamber.

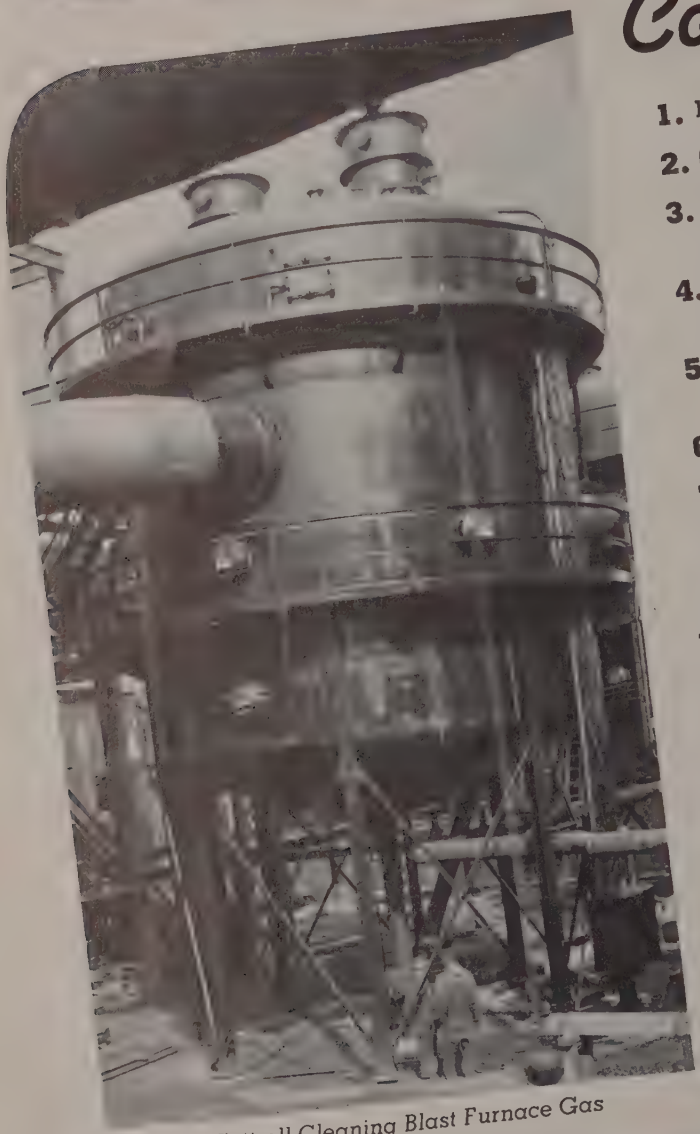
A resume of other sessions will appear in STEEL next week.

Iron—99.99 Per Cent Pure

■ **Iron, 99.99 per cent pure and containing only one-thousandth of 1 per cent carbon, is produced under direction of Dr. T. D. Yensen, Westinghouse research laboratories, East Pittsburgh, Pa. One hundred times as costly as ordinary iron, annual world consumption does not exceed 1000 pounds, which can be produced in less than a week. The metal is used as a laboratory yardstick in analyzing other elements. Photo shows Dr. Yensen watching his high frequency induction furnace. Carbon and oxygen from the heated iron are drawn off by means of a vacuum sysiem**

ONE DAY'S WORK FOR COTTRELL

Collecting



Cottrell Cleaning Blast Furnace Gas

1. 120 tons of fly ash at a power plan
2. 6 tons of soda salts at a paper mi
3. 55 tons of smelter dust containing percent copper.
4. 13 tons of sodium sulphate at 92 p cent content.
5. 3 tons of antimony dust from a sil refinery.
6. 208 tons of 12 percent copper dus
7. 1100 pounds of mercury dust.
8. 10 tons of arsenic.
9. 3 tons of tar at a gas plant.
10. 12,000 pounds of blast furnac fine cleaning.
11. 4½ tons of alumina.
12. 5500 pounds of concentrated su acid.
13. 220 tons of cement dust.
14. 20 tons of roaster dust.

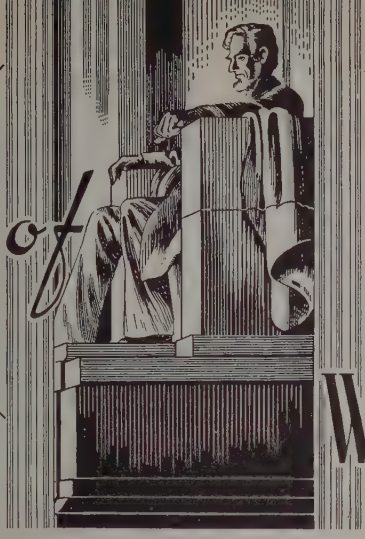
These DAILY savings of values for Cottrell installations. get similar benefits in the co any kind of dust, fog, fume any kind of dust nuisance el

Write for Bulletin

WESTERN PRECIPITATION CORPORATION
1016 W. 9th ST., LOS ANGELES, CALIF.
485 LEXINGTON AVE., NEW YORK, N. Y.

RESEARC CORPORATI
485 LEXINGTON AVE., NEW YO
50 E. VAN BUREN ST., CHICA

PIONEERS IN DUST AND FUME



Windows of WASHINGTON

. M. LAMM
ton Editor, STEEL

WASHINGTON

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my budget for the fiscal year of 1940. The request of the war department for this additional $6,000,000 for the purchase of machinery has been approved by both the President and the bureau of the budget.

SOUTHERN ORDNANCE PLANT TO BE PARTIALLY REOPENED

Navy has ordered partial reopening of its $25,000,000 World war ordnance plant at South Charleston, W. Va., to speed warship construction.

A small part of the long-idle plant, consisting of a few heating furnaces installed in one building, the navy said, will be leased to the Carnegie-Illinois Steel Corp., to accelerate delivery of light-weight, heat-treated plates. The plates, officials explained, are used in construction and are not armor plates.

The plates will be rolled at the company's Homestead, Pa., works, shipped to South Charleston for the heat treatment, and then returned for finishing.

The West Virginia ordnance plant, hurriedly established in the World war, has not been used for almost 20 years. Under administration plans to make available sufficient mechanics for the projected vast expansion of air forces, a portion of the plant and also the long-idle New Orleans navy yard are to be used by the national youth administration.

STUDY SHOWS NEED FOR FEDERAL TAX REVISION

Federal tax system should be drastically overhauled, according to a report made by the Brookings institution, a nongovernmental organization in Washington. The conclusions were contained in a report made for the institution by Dr. James D. Magee of New York university.

The institution suggested abolition of the tax on intercorporate dividends, substantial reduction of surtax rates on incomes in the higher brackets, abolition of the tax on undistributed profits, elimination of the normal income tax on corporate dividends, and disregard of capital gains and losses in computing taxes on corporation income. The report contends that existing tax levies are choking the flow of private funds into investment channels.

Dr. Magee said the report had not attempted to estimate the amount of revenue that would be lost from the suggested changes or to suggest other taxes to make up the deficiency. But, he added, "it is our view that even if there should be, immediately speaking, a considerable net reduction in tax revenues, the gains resulting from the stimulus to the expansion of private enterprise would, in the near future, much more than offset the probable revenue losses."

The tax situation on Capitol Hill is in a muddled condition. Treasury department officials are contending the ways and means committee of the house, which originates tax legislation in congress, has not asked them to appear in connection with tax changes; committee members say treasury department experts could appear any time.

PRESIDENT PROPOSES REORGANIZATION PLAN

President Roosevelt last week sent to the senate the first of three government reorganization plans. This week he will transmit two additional reorganization plans, one of which he called an interdepartmental plan and the other an intradepartmental plan.

Under the plan submitted last week, a number of independent organizations would be grouped under three new agencies to be known as federal security, federal works and federal loan. The President estimates a $20,000,000 annual saving in administrative costs.

Component parts of the three new

agencies are set forth in the order as follows:

Federal security agency: Social security board, now independent; United States employment service, now in labor department; public health service, now in treasury; national youth administration, now a part of WPA; and civilian conservation corps.

Federal works agency: Bureau of public roads, now in agriculture department; public buildings, branch of the treasury's procurement division; building management, branch of the national park service (in relation to buildings it operates for other departments); United States housing authority, now in interior; public works administration, now in interior. WPA, now independent, is transferred to the new agency, but with its identity retained for the time being under the title of work projects administration. It would be a subordinate unit of the works agency.

Federal loan agency: Reconstruction finance corporation, electric home and farm authority, federal home loan bank board, federal housing administration, and associated agencies and boards, including the export-import bank of Washington.

Other independent lending agencies set up since 1916 are transferred to the agriculture department because, the President explained, they deal directly with that phase of government. These are: Farm credit administration, Federal Farm Mortgage Corp., and Commodity Credit Corp.

Agencies that would go under the direct supervision of the executive are: Budget bureau, from the treasury department; central statistical board, made a part of the budget bureau; national resources committee, now independent; federal employment stabilization office, taken from commerce department and made part of the resources committee, with its name changed to national resources planning board.

LEON HENDERSON NAMED TO SUCCEED DOUGLAS ON SEC

President Roosevelt has nominated Leon Henderson, executive secretary of the temporary national economic committee, to succeed William O. Douglas as member of the securities and exchange commission.

Mr. Henderson, native of New Jersey, is 44 years old and is known in Washington as one of the leading left-wing New Deal economists. He is particularly close to Secretary of Commerce Hopkins and Secretary of Interior Ickes, was one of the economic advisers of the NRA, having come to Washington in 1934 to accept that position. He has been secretary of the TNEC since its organization last year.

HOUSE COMMITTEE APPROVES MACHINE TOOL TRADE-INS

Favorable report has been made to the house by the military affairs committee on H.R.-3587, providing "the secretary of war be, and is hereby, authorized to exchange obsolete, unsuitable, and unserviceable machines and tools, and parts thereof, pertaining to the manufacture or repair of ordnance *materiel* for use in the national defense, for new machines and tools of the same or equivalent general character." This bill is identical with one now on the senate calendar.

LEISERSON NOMINATED TO LABOR RELATIONS BOARD

American Federation of Labor won a victory last week when the President sent to the senate the nomination of Dr. William M. Leiserson, Ohio, as a member of the national labor relations board to succeed Donald Wakefield Smith, who is now serving a recess appointment.

Considerable controversy has raged about Mr. Smith because of his alleged radical views, not only from industrialists but from the AFL. Dr. Leiserson is chairman of the national mediation board which has jurisdiction over railway labor problems, having been appointed to that position for a 5-year term from August, 1938.

REPORTS FAVORABLY ON TIN BILL AMENDMENT

House military affairs committee has reported favorably on a bill to amend the 1936 act protecting domestic tin sources. Amendment would prohibit the exportation of "other scrap drosses, or residues, the tin content of which is in excess of 10 per cent, in which the copper content does not exceed the tin content."

Said the committee:

"Tin is one of the metals most widely used in this nation and is essential to our economic life during peacetime or war. We normally consume about 60,000 tons of virgin tin and produce none. We do have, however, a domestic detinning industry which recovers tin to the amount of as high as 25 per cent of our importations of virgin tin. This recovery is partly from tin scrap but mostly from junk tin and drosses. This tin recovered from junk is used in bearings and commodities other than tin plate. It relieves the drain on the supply of virgin tin. The industry engaged in recovering tin acts in the manner of a reserve supply in case this nation should be cut off from importing tin fr

"At the present time terests are draining thi valuable sources of tin and the recovery indus ened with destruction b dearth of material. Th acted into law, would p bargo upon the exp scraps, drosses, or resi content of which is in per cent, in which the co does not exceed the tin ception is by permit is secretary of war."

WAR DEPARTMENT I FIRST EDUCATIONAL

War department has award to six manufactu first educational orders, a which will be placed this

The present session c has authorized the exp an additional $32,500,000 tional orders after July the actual appropriatio yet been made.

American Forge Co. w an award for 75 mm she S. A. Woods Machine C chining 75 mm shells; Tire & Rubber Co. for Winchester Repeating A new semiautomatic rifle Electric Co. for searc antiaircraft artillery; a & Co. for recoil mechan antiaircraft guns. All awards were made witho mal requirement of comp ding.

The war department i ing these awards said are merely a beginning 60 or 70 critical items commercial counterparts ing the field of gas de munications, and fire co ment; military airplanes accessories; small arms ammunition, and combat

GOVERNMENT IRON, AWARDS TOTAL $510,

During the week ende the government purcha 973.18 worth of iron, stee products under the W act, as follows: National Washington, $59,580.60; Co., Erie, Pa., $59,025; Products Corp., Jersey C $12,458; Edward G. Budd Philadelphia, $124,012.9 hem Steel Co., San Fran 263; Carnegie-Illinois St Washington, $35,490 Youngstown Sheet & Youngstown, O., $23,29 ed); Wire Rope Corp. Inc., New Haven, Conn Morse Chain Co., Ithaca, 380; Joseph T. Ryerson Chicago, $14,257.62; Stee tion Co., Portland, Oreg

TION

RAINING PROGRAMS LABOR SHORTAGE

ıortage of skilled labor nts the various branches s rapidly growing aero- ıstry.

actories steadily expand, builders are finding it ılt to man production ıs in the Los Angeles are said to be requiring nal men daily. Total ment now approximates pared with 40,000 three

y strict are qualifica- orkers in this industry. large eastern manufac- some days we interview 1200. Of this number it more than 40 are quali-

experience sometimes andicap. One company dinary sheetmetal work- en lacks the skill and quired for aircraft ma-

ll important airplane resorting to their own ograms. These include systems, foreman train- plant lectures and exten- in engineering schools. sport companies need ained mechanics. Amer- s recently inaugurated e school to meet its re-

uled expansion of mili- tary aviation will necessitate large-scale personnel increases. Army air corps plans to train 16,000 mechanics, boost its annual quota of cadet flyers to 2000. Allied is the project for training 20,000 student aviators annually.

The air corps expansion program got underway last week when warplane contracts totaling more than $50,000,000 were released following President Roosevelt's signing the $549,000,000 war department supply bill. Orders for 571 planes, including four-engined bombers, pursuit, interceptor and observation craft, went to five builders. This is the largest aircraft award in air corps history.

Award Contracts for Parts

Bids for attack-bombers opened by the army ranged from $1,225,000 for a single ship to $48,951 in lots of 1000. The army has awarded accessory contracts to: Wright Aeronautical Corp., Paterson, N. J., exhaust manifolds and parts, $162,263; Keuffel & Esser Co., Hoboken, N. J., drift meters, $129,950; and Curtiss-Wright Corp., New York, propellers and hubs, $94,627.

Grumman Aircraft Engineering Corp., Bethpage, L. I., has booked two navy department orders, $1,096,476 and $466,367, for airplanes and parts. Other recent navy awards: B. G. Corp., New York, spark plugs, $57,984; and American Brass Co., Waterbury, Conn., aircraft tubing, $33,134.

Ryan Aeronautical Co., San Diego, has received an order from the Chinese nationalist government for all-metal training planes costing between $750,000 and $1,000,000. Royal Dutch Airlines last week ordered a DC-3 21-passenger transport costing $120,000 from Douglas Aircraft Co. Inc., Santa Monica, Calif.

Contracts will soon be let by Northwest Airlines Inc., St. Paul, for six Douglas DC-3 planes costing $720,000; six engines, $73,800; and radio equipment, propellers and parts, $64,100. Purchase is to be partially financed with an RFC loan.

Howard Aircraft Corp., Chicago, proposes to construct a one-story, 120 x 550-foot plant to cost $150,000.

Thomas Gassner Co. Inc., Philadelphia, builder of metalworking machinery for the last 100 years, has entered production of aircraft parts. Its first order, from Bell Aircraft, was for gear boxes.

Plans for new all-metal transport planes are announced by Lockheed Aircraft and Douglas Aircraft. Lockheed will build a 13-ton, four-engined, 28-passenger airliner, known as the "Excalibur"; and a 5½-ton, twin-engined "Electra 16-E." Douglas intends to add a new DC-6 four-engined craft.

ısh-Type Rivets Used in New Bomber

rgoing army tests, this new all-metal Stearman X-100 attack-bomber h speed and large bomb load capacity. Carrying crew of four, it . Construction is featured by use of flush-type rivets on all exterior ecrease drag, and wide transparent panels in the nose to improve visibility

Gray Iron Founders Nominate Directors

■ Gray Iron Founders' Society Inc. will elect directors at its annual meeting, May 15, Netherland-Plaza hotel, Cincinnati. Nominees are:

THREE-YEAR TERM (1939-1942)

C. R. CULLING, vice president, Carondelet Foundry Co., St. Louis.

A. L. KATELMAN, manager, Katelman Foundry & Mfg. Co., Council Bluffs, Iowa.

S. C. MEFFORD, treasurer, Auburn Foundry Inc., Auburn, Ind.

C. J. MILLER, president, Fremont Foundry Co., Fremont, O.

R. D. PHELPS, president, Francis & Nygren Foundry Co., Chicago.

PETER E. RENTSCHLER, president, Hamilton Foundry & Machine Co., Hamilton, O.

ONE-YEAR TERM (1939-1940)

D. A. CULLINAN, president, Western Foundry Co., Chicago.

T. I. CURTIN, president, Waltham Foundry Co., Waltham, Mass.

A. C. DENISON, president, Fulton Foundry & Machine Co., Cleveland.

WILLIAM J. GREDE, president, Liberty Foundry Inc., Wauwatosa, Wis.

R. E. KUCHER, vice president, Olympic Foundry Co., Seattle.

HUGH MARTIN, president, Detroit Gray Iron Foundry Co., Detroit.

W. F. MOSSER, secretary-treasurer, W. F. Mosser & Son, Allentown, Pa.

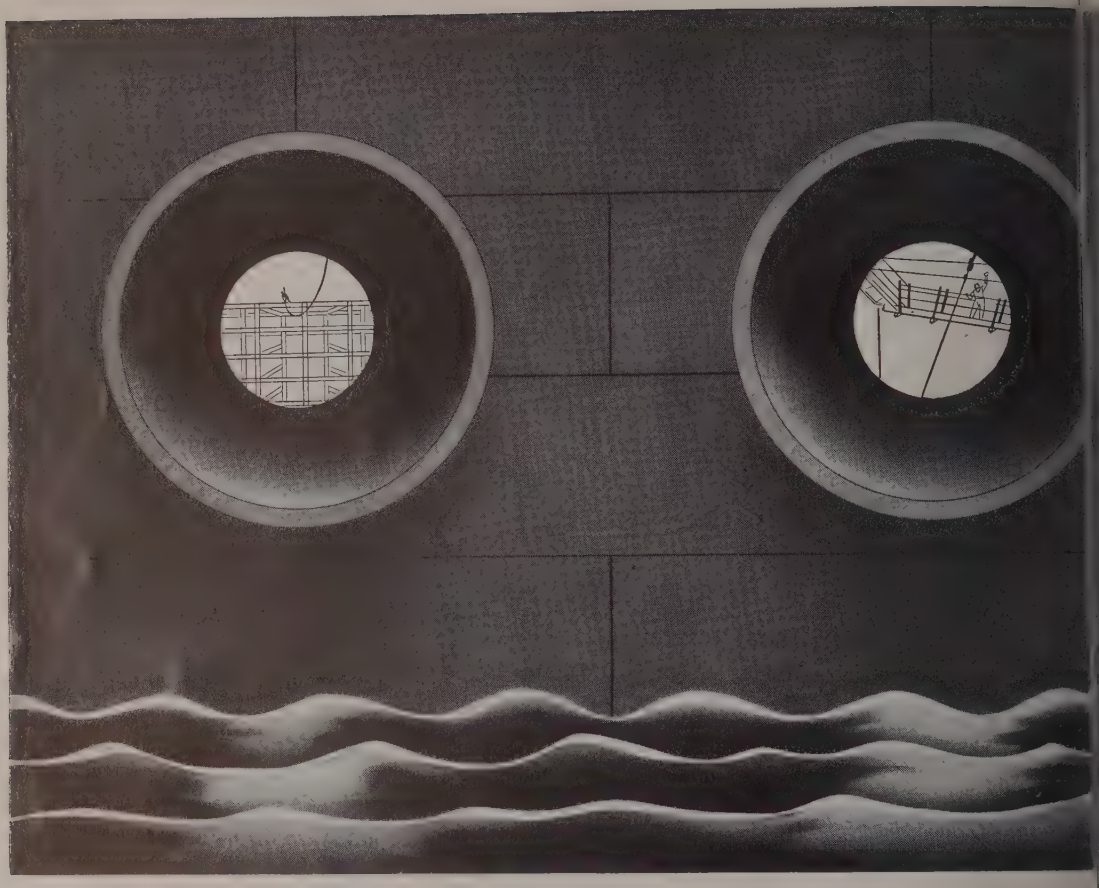
J. H. POHLMAN, president, Pohlman Foundry Co. Inc., Buffalo.

R. J. REDMOND, secretary-treasurer, Buckeye Foundry Co., Cincinnati.

A. J. RUMELY SR., president, LaPorte Foundry Co., LaPorte, Ind.

W. L. SEELBACH, secretary-treasurer, Forest City Foundries Co., Cleveland.

EDGAR SPENCER, treasurer, Philbrick-Booth & Spencer Co., Hartford, Conn.



A CAST IRON THAT CUTS CO

Especially tough service requirements need not call for expensive alloy combinations. Often a less costly, but judiciously chosen, material will do the work.

Such was the case with castings for reservoir discharge nozzles and lock-gate valves. Physical specifications called for 55,000—65,000 p.s.i. tensile strength, 5,300—6000 lb. transverse strength (12" centers), 220-240 Brinell hardness.

All this plus the ability to withstand the corrosion of water containing sulphuric acid from mine drainage.

Copper-Molybdenum iron containing (
Copper and 0.30 — .40% Molybdenum m
quirements of strength, hardness and aci
The lock-gate valves have been in servic
without noticeable signs of corrosion or

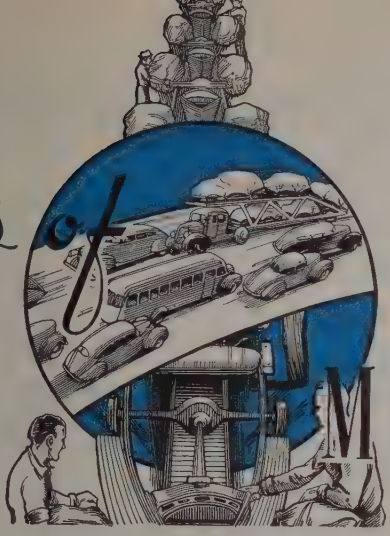
Investigation may show where you, too
Molybdenum iron to advantage. Our tec
"Molybdenum in Cast Iron" which contai
practical data, will be sent free on request
production executives and employees.

PRODUCERS OF MOLYBDENUM BRIQUETTES, FERRO-MOLYBDENUM, AND CALCIUM M

Climax Mo-lyb-den-um Compa
500 Fifth Avenue • New York C

MOLY

Mirrors of MOTORDOM



A. H. ALLEN
roit Editor, STEEL

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DETROIT

TIONARY changes in
ns are forecast in the
ears by experimental
in process hereabouts.
s for automobiles, air-
en marine craft are all
efit from the improve-
possible by these new
e of which have been
opment for over ten

rs lately have spurred
the point where com-
ufacture of some of
s is considered only a
onths. One is the per-
new high-octane (100)
nitting still higher com-
os, and the other is the
tivity in aircraft con-
turn occasioned by a
cied national defense

little early to give com-
of these new engines,
y discussion of salient
ggest what is in store.
a so-called "barrel" en-
a combination of the
-line principles of con-
h some 20 cylinders in

designed with an over-
naft and inverted pis-
smaller crankshafts
ained to the main shaft
sleeve valves somewhat
ose used on the Knight
th the inverted design,
roblems are simplified,
kcase ventilation being
f course, and sleeve
t higher speeds, more
e action, more horse-
ubic inch displacement,
l weight and other ad-
s design is understood
into the preliminary
nase, with 30 of the en-
led to be built under

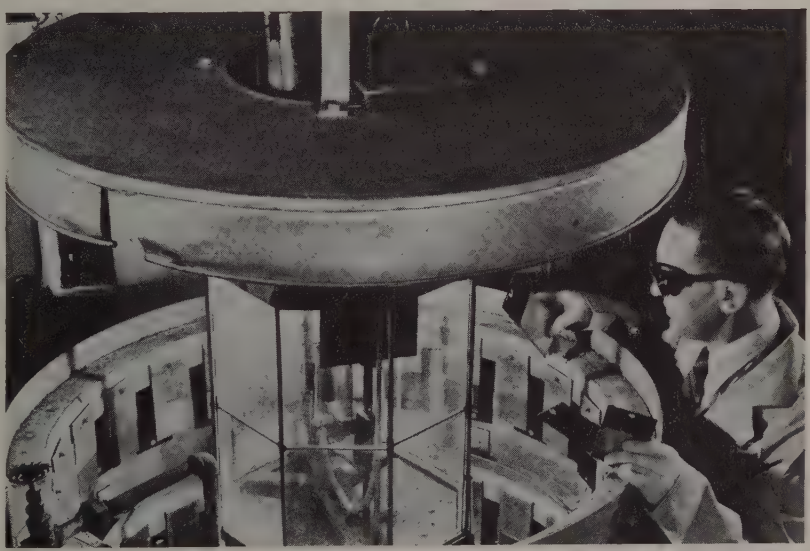
sponsorship of one of the "big three".

The split-sleeve valve principle is the feature of a third line of engines, and has been adapted successfully to in-line engines, aircraft radials, diesels, large marine engines and other units. The sleeves are in the form of half cylinders fitting between the block and an inner sleeve in which the piston travels. Exhaust and inlet ports are opened and closed by up and down movement of the sleeves which are actuated by separate crankshafts geared to the main crankshaft, and no springs are required in the valve operation.

The latter development has great possibilities in the aircraft engine field, and one of the large automobile companies already has taken steps leading to eventual manufacture of such a line of engines.

Other engine developments include new activity on a small engine by Ford, the new two-cylinder two-cycle engine used in the Cros-

Artificial Sun and Rain Test Auto Finishes



■ **Man-made sunshine, developed by a carbon arc lamp, tests the durability of car finishes for De Soto in this fadometer used at the Chrysler Corp. engineering laboratories. The drum containing the paint panels revolves once every two hours to insure uniformity of exposure, while water is sprayed on the panels for 15 minutes of every two-hour period to simulate rainy weather conditions. This equipment is used in conjunction with outdoor paint proving grounds operated by the corporation in Florida**

ley car unveiled at Indianapolis last Friday, new aircraft engines developed by Continental Motors Inc., and some others which have not yet attained much stature.

Automobile company engineers are recognizing the continued trend toward higher speeds and higher compression ratios, and they realize that gradually the limits are being reached on satisfactory operation of poppet valves. Perhaps as early as 1941 models the adoption of sleeve-valve engines will be at hand.

Some of these new designs, by the way, are ideally adapted to the use of welded rolled steel construction and it is not at all impossible that this type of engine block may be perfected for automotive engines in the interests of reducing dead weight. Some engineers are of the opinion welded rolled steel is easier to fabricate than aluminum alloys and can be used to build an engine that is just as light as an aluminum design with equivalent strength.

At the same time it is likely nitrided steel sleeves for valves on this type of engine will be successful. Work which Ford engineers have done in the direction of developing thin-gage nitrided steel cylinder liners, formed from material as light as fender stock, is blazing a trail for economical manufacture of valve sleeves.

New engine designs usually are perfected years in advance of their appearance on production models. Often their initial appearance in service is made secretly in cars entered in the 500-mile Memorial day race at Indianapolis. One of the first Ford V-8s was tested in this way, and it is reported around Detroit that if you could look under the hoods of every car in this year's race, you would see some interesting ideas which later may be introduced in passenger car engines.

■ SOME important meetings of executives in leading motor car divisions have been held here in the past two weeks to determine what effect earlier reports of plans to introduce some 1940 models this summer may have had on spring sales.

Consensus was that these reports have had a definitely injurious effect, and as a result some of the pressure has been eased off on new model programs and the lid clamped down tighter on public and private discussions of new models.

With one or two exceptions, it now appears the bulk of 1940 models will appear about on schedule, or in sufficient time to make initial appearances at the New York showing Oct. 11. Dealers are being discouraged from making advance comment on new models; in fact, retail outlets of one leading low-price car are telling customers their 1940 models will not be available until next January.

First-quarter financial report of General Motors Corp. which revealed a net profit of over $53,000,000, or $1.18 per share on common stock, is the best showing the corporation has made for this period since 1929, and could be considered one potent reason for putting added pressure on sales of 1939 models and delaying new models.

Current war scare and agitation over national defense needs are accredited in some sources with being additional reasons for deferring activity on 1940 models. In the event of an emergency, it is likely most of the large motor plants would be conscripted for war *materiel* production, and should such an emergency arise in the next few months, it would be better not to have any conflict with new model programs.

Bodies for the small Nash car which has been in process of development for the past year will not be made by the Seaman body division of Nash, but instead will be fabricated and assembled by an outside source, probably Briggs. Inasmuch as production dies as yet have not been started, it probably will be six months at least before the car will be ready for introduction.

Releases on certain parts for Chevrolet May production schedules indicate present plans call for 70,000 assemblies. This is somewhat below the 90,000 assembled in March and the indicat sembled in April, b moved up this month mand should justify an

■ NEWSMEN, supplie tributors and others w Friday at Indianapolis way for the formal un new Crosley car, the maestroed by promote agan. A few cars, wit frames largely handm ray Corp. in Detroit w and showed some chan original specifications a year ago. Wheelba lengthened to 80 inche front and read tread a Bodies have both fro seats, each accommoda sengers. Two hundred represented the 25,000 ers who will retail the

Latest figures suppli show domestic retail s second ten days of 9614 units, or 61 per c the same period a year a month ago. Volume est in ten years and panied by used car sa than 14,000 units.

Hudson has just a series of eight conver which are being featur colors and in two body passenger coupe and brougham. Tops fold cesses in the body, uph in colored leather. colors, nine of the opa are offered. A rathe shakeup has been mad personnel, including th of sales manager W. announced in STEEL las

Another personnel ch motor industry recentl the association of Che ding, for 15 years con various units of Chr with Willys-Overland M assistant to the gener Mr. Codding at one tim ciated with the former Chalmers automobiles, the first Chrysler mod terly as assistant to president of De Soto.

Commenting on plast in automobiles, S. G. Sa officer of Chrysler, sta cent chemical society m ideal plastic material the strength and rigidi steel, the ease of formin ing of potter's clay, th of sugar maple, the co rainbow, and the finish ished' tool steel." En stated, still doubt that veloped so far in the o tics field can take the pl in any of the fundamen tural parts of the auto

Automobile Production

Passenger Cars and Trucks—United States and Canada
By Department of Commerce

	1937	1938	1939
Jan.	399,186	227,130	353,946
Feb.	383,900	202,589	312,141
March	519,022	238,598	389,489
3 mos.	1,302,108	668,346	1,055,576
April	553,231	238,133	*352,000
May	540,377	210,183	.....
June	521,153	189,399	.....
July	456,909	150,444	.....
Aug.	405,072	96,936	.....
Sept.	175,630	89,623	.....
Oct.	337,979	215,296	.....
Nov.	376,629	390,350	.....
Dec.	347,349	407,016	.....
Year	5,016,437	2,655,777	.....

*Estimated.

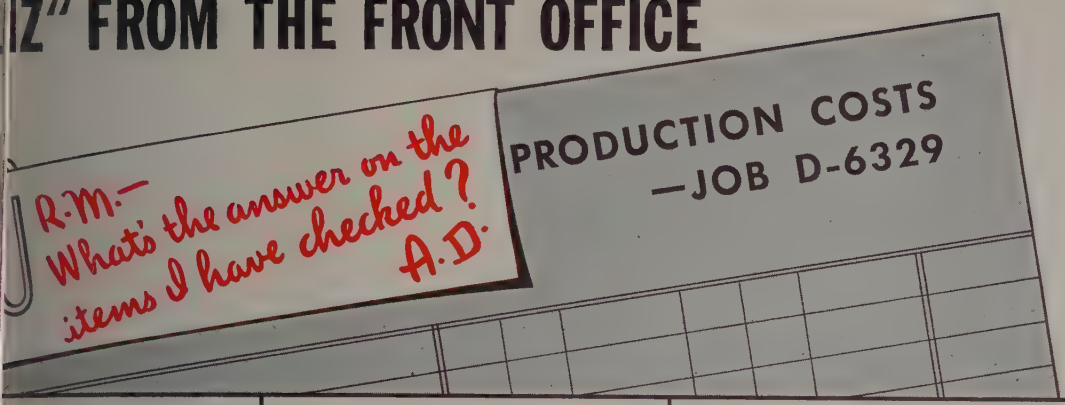
Estimated by *Ward's Reports*

Week ended:	1939	1938†
April 1	85,980	57,500
April 8	87,019	60,975
April 15	88,050	62,021
April 22	90,280	60,563
April 29	86,640	50,755

†Comparable week.

	Week Ended April 29	Week Ended April 22
General Motors	35,005	34,405
Chrysler	19,325	23,625
Ford	21,460	21,480
All others	10,850	10,770

IZ" FROM THE FRONT OFFICE



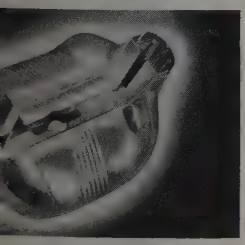
OST ✓

e cost of die casting dies vorably with the tooling er production processes?

o general opinion, tooling for specially in zinc alloys—is of- ost than for comparable manu- ods. And in most cases one die the rapid production of sizable

NG ✓

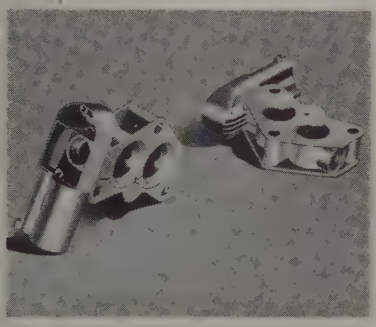
duction dollars be saved castability of the ZINC Alloys?



ng machine wringer frame pre- casting requirements. Its size x 6⅝"), the necessity for sitioned fastening elements, mooth surfaces, and thin sec- l up to impressive production ough the unusual castability ie Casting Alloys.

MACHINING ✓

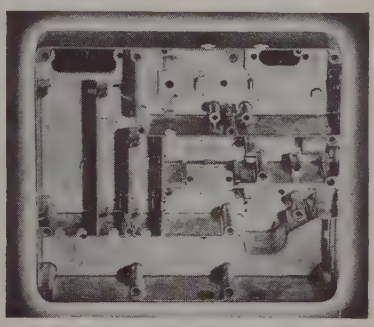
Q Does die casting eliminate the necessity for costly machining operations?



A No metal production method can entirely eliminate the necessity for machining. But the number of operations was reduced 77% when the above part was switched to a die casting. 40 major machining operations were formerly required. Now there are only 9—and these are simple and economical. This is just one of many cases in which impressive machining economies have been reported.

ASSEMBLING ✓

Q Can assembly costs be pared with die castings?



A This ZINC Alloy Die Casting—an automobile radio chassis—was produced in one shot. By no other method could such complexity of design be economically achieved—in one piece. The savings in assembly are obvious.

Although ZINC Alloy Die Casting ✓ has received wide recognition as a low cost production method, the excellent physical characteristics of the die castings themselves should not be overlooked. If you are not aware of these advantages we suggest that you consult a commercial die caster—or write to The New Jersey Zinc Company, 160 Front Street, New York.

ZINC ALLOY DIE CASTINGS

arch was done, the Alloys were developed, and most Die Castings are specified with

RSE HEAD SPECIAL (99.99+% Uniform Quality) ZINC

March Exports Gain 20 Per Cent

■ MARCH iron and steel exports, excluding scrap, totaled 162,098 gross tons valued at $12,569,693, an increase of 20.3 per cent in volume and 28.6 per cent in value compared with 134,777 tons valued at $9,772,707 tons in February. In March, 1938, exports were 188,185 tons valued at $13,983,304.

Exports in the first quarter totaled 431,663 tons valued at $32,556,947, comparable figures for the period last year: 621,792 tons valued at $41,585,202. The reductions are 30.6 per cent in quantity and 21.7 per cent in value.

Nonalloy plates represented the largest amount in March, 27,942 tons; including 12,950 tons to Kwantung, 3875 tons to Sweden, 2061 tons to the Netherlands and 1946 tons to Italy. Nonalloy black steel sheets were second, 27,805 tons; 7963 tons to Russia, 2875 tons to Canada, 2839 tons to the United Kingdom, 2268 tons to Chile and 2199 tons to Mexico.

Tin plate accounted for 16,735 tons; 2069 tons to the Netherlands, 1893 tons to Brazil, 1765 to French Indo-China, 1520 to British Malaya and 1461 to the Philippines.

Canada Heaviest Buyer

Canada led all markets with 15,200 tons, which included 2875 tons of nonalloy black steel sheets, 1971 tons of structurals and 1413 tons of nonalloy hot-rolled strip. Kwantung ranked second, 13,835 tons; the Philippines third, 12,787 tons; and Japan fourth, 9745 tons.

March scrap exports totaled 310,223 tons valued at $4,640,598, largest this year. February totals were 222,704 tons valued at $3,345,344; March, 1938, 334,742 tons valued at $5,530,042.

Scrap exports for three months, 758,361 tons valued at $11,337,293, were 19.8 per cent in volume and 29.2 per cent in value under first quarter, 1938. Japan took 200,470 tons, Italy 69,540 tons and Sweden 9521 tons.

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Article	March 1939	Feb. 1939	Jan. thru March 1939
Pig iron	1,059	4,524	11,908
Ferromanganese and Spiegeleisen	18	9	27
Other ferroalloys	68	22	193
Ingots, blooms, etc.:			
Not containing alloy	5,709	10,140	29,215
Alloy, incl. stainless	408	3,335	4,724
Steel bars, cold fin.	498	542	2,330
Bars, iron	58	54	173
Bars, concrete	2,181	1,378	6,030
Other steel bars:			
Not containing alloy	12,702	7,039	26,662
Stainless steel	117	4	132
Alloy, not stainless	993	1,144	3,489
Wire rods	2,654	360	3,367
Boiler plate	171	564	1,853
Other plates, not fab.:			
Not containing alloy	27,942	20,324	58,017
Stainless steel	8	6	17
Alloy, not stainless	70	70	178
Skelp iron or steel	714	637	2,093
Sheets, galv. iron	385	335	1,149
Sheets, galv. steel	7,202	5,433	19,961
Sheets, "black" steel:			
Not containing alloy	27,805	19,886	71,959
Stainless steel	76	41	169
Alloy, not stainless	290	31	668
Sheets, black iron	616	577	1,769
Strip steel, cold-rolled:			
Not containing alloy	1,436	2,212	5,625
Stainless steel	21	45	122
Alloy, not stainless	23	31	65
Strip steel, hot-rolled:			
Not containing alloy	2,608	5,765	13,453
Stainless steel	.....	.....	100
Alloy, not stainless	2	3	6
Tin plate, taggers' tin	16,735	10,968	40,373
Terneplate	232	221	611
Tanks, except lined	2,881	374	4,697
Shapes, not fabricated	6,522	5,603	17,529
Shapes, fabricated	3,422	2,180	7,020
Plates, fabricated	315	153	615
Metal lath	102	85	266
Frames and sashes	91	105	237
Sheet piling	140	546	853
Rails, 60 lbs.	3,465	3,681	10,058
Rails, under 60 lbs.	123	97	305
Rails, relaying	686	972	1,840
Rail fastenings	732	832	2,206
Switches, frogs, crsgs.	302	58	543
Railroad spikes	212	676	995
Railr'd bolts, nuts, etc.	213	123	409
Boiler tubes, seamless	651	439	1,475
Boiler tubes, welded	5	3	16
Pipe:			
Smls casing, oil-line	5,129	4,854	13,212
Do., Welded	274	61	628
Seamless black	452	415	1,608
Pipe fittings:			
Mall. iron screwed	270	248	827
Cast-iron screwed	175	145	405
Pipe and fittings for:			
Cast-iron pressure	1,274	1,170	4,498
Cast-iron soil	546	663	1,844
Pipe, welded:			
Black steel	1,280	1,272	3,742
Black wrought iron	424	147	1,063
Galvanized steel	2,368	1,571	5,435
Galv. wrought-iron	160	382	745
*All other pipe, fittings	302	286	836
Wire:			
Plain iron or steel	3,154	1,345	6,521
Galvanized	1,773	2,477	6,368
Barbed	3,404	1,937	7,720
Woven-wire fencing	364	198	769
Woven-wire screen cloth:			
Insect	39	29	102
Other	128	114	351
Wire rope and cable	288	379	909
Wire strand	127	102	269
Electric welding rods	147	62	297
Card clothing	5	3	14
Other wire	577	450	1,597
Wire nails	1,497	1,176	4,201
Horseshoe nails	87	53	206
Tacks	21	22	56
Other nails, staples	351	252	912
Bolts, mach. screws	774	549	1,909
Castings:			
Gray iron (incl. semi-steel)	309	219	787
Malleable iron	118	132	370
Steel, not alloy	57	190	283
Alloy, incl. stainless	116	200	394
Car wheels, tires, axles:			
†Car wheels and tires	1,094	655	2,540
†Car axles, no wheels	743	62	1,375
†Car axles with wheels	587	610	1,221
Horseshoes and calks	6	30	37
Forgings, n.e.s.:			
Not containing alloy	666	618	1,681
Alloy, incl. stainless	349	72	429
Total	162,098	134,777	431,663
Scrap, iron and steel	310,223	222,704	758,361
Scrap, tin plate	866	805	2,528
Tin plate circles, strips, cobbles, etc.	437	546	1,765
Waste-waste tin plate	736	858	2,405
Total scrap	312,262	224,913	765,059
GRAND TOTAL	474,360	359,690	1,196,722
Iron ore (gross tons)	65,890	1,079	67,213

*New class. Includes flanged malleable cast-iron fittings, expansion joints, and riveted pipe and fittings.
†New class.

Japan Doubles ... Metalworking M...

■ Japan's metalwork... imports from the U... United Kingdom, G... Switzerland, which sup... per cent, were valued ... in 1938, compared wi... in 1937, an increase of ... according to the machi... department of comme... rent report. Compa... 359,707 in 1935 the 19... about six and one h... large.

United States was ... source in 1938, supplyin... valued at $23,811,408. ... ments at $2,285,000 pe... far this year, 1939 may ... er total.

In 1934 Germany s... per cent of Japanese im... class, the United Sta... cent. In 1938 Germany ... 26.6 per cent; United S... cent. The machinery ... ports that European con... allow Germany to e... heavily and points out ... that country's machine... Japan increased 149 pe... largest gain of the f... Further comparisons:

	——1937—— Value	%	
U. S.	$12,151,886	69.6	S...
Germany	3,788,825	21.7	
Unit. King.	776,178	4.5	
Switzerland	733,551	4.2	
Total	$17,450,440	...	8...

Machinery Export ... 17 Per Cent in Ma...

■ March industrial mac... ports were valued at $29... 17 per cent more than ... 1938, according to the ma... vision, department of com...

Power-driven metalwo... chinery reached a record ... 012, a gain of 45 per cen... 297,396 in March, 1938. ... large shipments to Rus... and the United Kingdom ... ly increased exports to ... counted for the increase ... per cent going to these ... tries.

Power generating equip... cept electric and automoti... sented $2,099,629 in valu... cent gain over March, 193... large increase in petrole... and refining equipment ex... mining, well and pumpi... ment group made a sli... from $6,147,255 in March ... to $6,259,655 in the month ...

Construction and conve... chinery exports declined 32 ... from March, last year, with ... $1,827,541, compared with $...

eel Uses
ty Liner

nd extensive uses of proofing and decora- rporated in the PAN- er placed in service y safety specifications of marine inspection n.

one of three 10,000- ssels for the Panama nship Co.'s service be- rk and the Canal Zone, tons of steel. It was George G. Sharp, New chitect, with Raymond trial designer, collab- ecorations and finish- s built by Bethlehem the Fore River yards, s., where two sister CON and CRISTOBAL, are pletion.

capacity for 202 pas- addition to crew, and 70 cabins is equipped bath. Overall length is molded beam, 64 feet; romenade deck, 46 feet, et tonnage is 5925; to- ht tonnage, 6800.

ons are asbestos-core Ten transverse water- ads divide the vessel rtments with local sub- machinery spaces. Any se compartments, it is pierced simultaneously eting the ship's ability t.

is steel, aluminum al- loys and other noninflammable materials, with sponge rubber and fireproofed fabrics in upholstery. Venetian blinds in cabins are steel. Controls for a modern fire detection system and extinguishers are centralized in a special station.

Simple, unified and modern effects are achieved in decorative treatment. Windows are grouped into panels; steel structural beams are accented or subdued, according to effect desired.

Ship is decorated throughout in pastel shades, with stainless steel, aluminum alloys and plastics effectively used.

teel, aluminum, glass and synthetics contribute to a simple, modern re-proof liner, the PANAMA, first to be built under the new safety adopted by the bureau of marine inspection and navigation following the MORRO CASTLE and MOHAWK disasters

MEETINGS

INSTITUTE PROGRAM LISTS FOUR TECHNICAL PAPERS

■ PROGRAM for the forty-eighth general meeting of the American Iron and Steel institute, Waldorf-Astoria hotel, New York, May 25, includes morning session, an informal luncheon, an afternoon technical session, and a banquet. As in recent years, attendance at all meetings will be restricted to members.

T. M. Girdler, chairman, Republic Steel Corp., Cleveland, and president of the institute, will preside at the morning session and will deliver the opening address. Other speakers at this session will be B. F. Fairless, president, United States Steel Corp., Pittsburgh; and Arthur Roeder, chairman, Colorado Fuel & Iron Corp., Denver.

Charles M. White, vice president, Republic Steel, Cleveland, will preside at the technical session. Papers and their authors: "Metallurgy and Technique of Welding," by Isaac Harter, executive vice president, Babcock & Wilcox Tube Co., New York; "Problems in the Manufacture and Use of Steel in the United States," by James E. Lose, vice president, Carnegie-Illinois Steel Corp., Pittsburgh; "Problems in the Manufacture and Use of Steel in Great Britain," by James Henderson, deputy chairman, Appleby-Frodingham Steel Co. Ltd., London; and "Training of a Metallurgist," by Bradley Stoughton, dean of engineering, Lehigh university, Bethlehem, Pa.

MIDDLE ATLANTIC CHAPTERS OF A.S.M. TO MEET MAY 19

New York, New Jersey, Penn State, York, Lehigh Valley, Philadelphia and Baltimore chapters of the American Society for Metals will conduct a Middle Atlantic group meeting at the Manufacturers and Bankers club, Philadelphia, May 19.

Dr. Edgar C. Bain, assistant to vice president, United States Steel Corp., Pittsburgh, will address a morning technical session. Philadelphia Electric Co. will entertain at lunch at the club, the speakers to be William F. James, president, Philadelphia chamber of commerce, and George E. Whitwell, vice president in charge of sales, Philadelphia Electric Co.

Afternoon will be spent in visiting the plant of the Alan Wood Steel Co., Conshohocken, Pa., and a tour of Valley Forge. W. H. Eisenman, national secretary, American Society for Metals, Cleveland, will be toastmaster at the dinner; the principal speaker, Dr. John R. Hart, rector, Valley Forge Memorial chapel.

A.S.T.M. ARRANGING PROGRAM FOR ITS ANNUAL MEETING

Among important technical features of the forty-second annual meeting of the American Society for Testing Materials at Chalfonte-Haddon Hall, Atlantic City, N. J., June 26-30, will be discussions on effect of subatmospheric temperatures on properties of metals, fatigue of metals, radiography and quantitative spectrochemical analysis.

Demand has been growing in many industries for materials having properties suitable for use at low temperatures, including oil refineries, aircraft, railroads, and various chemical processes involving refrigeration. A roundtable on this subject will provide means for gathering available knowledge.

The fifth exhibit of testing apparatus and related equipment will be conducted during the five days of the meeting, a number of manufacturers having engaged space.

Tool Builders Base Confidence in Future on Peace-Time Activities

■ DESPITE the current mild decline in the general business index, general tone of the thirty-seventh spring convention of the National Machine Tool Builders' association, at the Edgewater Beach hotel, Chicago, April 24-25, was far more hopeful than that of the corresponding meetings in recent years. The convention was attended by top executives of a large proportion of the 135 tool building companies constituting the association.

Current conditions and the outlook for the reasonably immediate future—as described and analyzed by those who addressed the meeting this year—are such as to inspire definite confidence among machine tool builders, not only in the overall business outlook for 1939 but also as to the strength of the economic and engineering foundation upon which the industry now rests.

Deplore War Hysteria

It should be stated that this spirit of confidence has in no way been inspired by the war hysteria sweeping over Europe. This state of affairs is deeply deplored by American machine tool builders. While clearly understanding the importance of their industry in connection with preparations for adequate national defense of America, they are pinning their faith in the future on the wide opportunities presented by peacetime industrial activities in the United States and Canada, and not on any munitions activities generated by any foreign wars—either declared or undeclared.

Wendell E. Whipp, president, Monarch Machine Tool Co., Sidney, O., and president of the Tool Builders' association, crystallized the spirit of the convention when he captioned his opening address "Change Brings Opportunity." Drastic and rapid revisions in design of such things as railway equipment, automobiles, and aircraft, said Mr. Whipp, have meant that to make possible the production of these things the building of machine tools has had to become "America's fastest moving industry."

The charge sometimes made, that there is not enough research in the machine tool industry, can, according to Mr. Whipp, be refuted by pointing out that research as practiced by machine tool builders goes on in the shop and in customers' plants, rather than in the detached laboratories which are common today in many other industries.

While he deplores the taxes and undue governmental regulation which continue to discourage the re-equipping and expansion of established manufacturing enterprises and the establishment of new companies which ordina
quire large numbers
machines, Mr. Whip
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Outlook in South A

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in the world are locate
America.

Another speaker who
interesting and rather r
of trade opportunities fo
machine tool builders
borders of the United S
Russell T. Kelley, presi
sell T. Kelley Ltd., Ham
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Amplifier Carries Guides' Story to Visitors

■ Portable amplifiers carried by guides showing visitors through Caterpillar Tractor Co.'s plant at Peoria, Ill., make explanations audible to all listeners. The company considers this an important step in its public relations program

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lly in directors' meet-
ore, Mr. Scott urged that machine tool builders should in one way or another "profit motivate" all their selling efforts, to the end that every prospect shall become a properly informed "profit engineer."

In his paper on "Industrial Education," Everard Stubbs, factory manager, Fellows Gear Shaper Co., Springfield, Vt., outlined in considerable detail his conception of what he characterized as "industrial training for the world of tomorrow." He pointed out that because of the increasing demands being made on the machine tool industry for machines which in one way or another are "special" to suit the customers' individual requirements, a great deal of work in machine tool plants must now be done without jigs and fixtures. This calls for an unusually large number of mechanics in the shop with the skill and versatility which in the past has been common only in the toolroom.

Most boys today, said Mr. Stubbs, are definitely "machinery conscious" because they literally have been brought up in intimate association with radios, automobiles and other things mechanical. With such desirable raw material to work with, Mr. Stubbs believes that skilled, versatile mechanics can be developed rapidly by the simple expedient of shifting the more able young men about in the shop from job to job —a procedure which also serves to stimulate the ambition of men who may be in danger of going to seed on any one job. "Thus," said Mr. Stubbs, "foremen and superintendents of shops are now the 'faculty' of what may well be called America's greatest industrial school."

Mrs. Frida F. Selbert, secretary of the association, Cleveland, and widely recognized for her work as an economist in the capital goods industry, presented a significant paper covering "The Outlook for the Machine Tool Industry." At the beginning Mrs. Selbert advocated April or May as a far better time to get the "long view" of business, than the year end so commonly chosen as the time for such observations.

1939 Will Better 1938

While there has been too much dependence during recent months on foreign business, this condition has been due fully as much to failure of private capital to be invested as it should be in American industry, as it has been to abnormal conditions abroad. Incidentally, national defense requirements are nowhere near as important to the machine tool industry as the general public has been led to believe.

This year's average business for machine tool builders should, according to Mrs. Selbert's conclusions, be well above that of 1938. How far above, she believes, depends to no small degree upon effective promotion of the profit idea in machine tool selling. Mrs. Selbert's talk, which was illustrated by graphical charts, was discussed by Ralph E. Flanders, president, Jones & Lamson Machine Co., Springfield, Vt. Mr. Flanders said that to support the present wage scales, workmen in America must be provided with more and better tools, "a conviction which should make us all better salesmen."

The final paper at the convention was something of an innovation for one of these association meetings—being primarily of an engineering and production character. This paper, entitled "Airplane Engines of the Future," was by J. Carlton Ward Jr., general manager, Pratt & Whitney division, United Aircraft Corp., Hartford, Conn. It proved to be of keen interest to the machine tool builders—revealing as it did the important role which their machines are playing in aircraft engine production and the great possibilities for them which lie ahead in this relatively new and precedent-breaking industry.

Implying that an industry which does not hesitate to smash up a $50,000 hand-built model engine in tests,

(*Please turn to Page* 46)

Steel Caissons Barged, Floated 75 Miles

aissons, 66 x 120 feet, have been placed 150 get Sound at Tacoma, r foundations for the ge, world's third long-n span. Steel was rges at Seattle by Pa-oundry Co., towed 25 h Lake Washington canal to Lake Washington Shipyards, where watertight timber floor and sides were placed. Towed back 25 miles to Todd Shipyards Corp.'s dock, they were launched, floated 25 miles to the bridge site, and sunk. Illustration shows barge, 79 feet wide, with 825-ton steel caisson, traversing an 80-foot canal lock.

Editorial

Businessmen Falter in Public Relations

■ STEEL recently addressed this question to a number of heads of typical size companies in the metalworking field: "What are you doing to influence the man-in-the-street in your community to a greater realization that more jobs and greater security can be created for the average individual through a national policy of encouraging the investment of more capital in industry?"

None of the companies that replied is doing any such public educational work directly. A few of them are familiar with, and endorse educational work such as that of the National Association of Manufacturers. One stated he is co-operating actively in such effort, but is not doing anything of a direct nature.

Industrial leaders continue singularly lax in this matter of public relations. That they are keenly concerned about the problems that confront the country, and have definite ideas as to how the march toward greater security and a better plane of living conditions can be resumed, is well attested by the large amount of discussion they devote to this subject. The trouble is that they usually do their talking with others of like mind, or in meetings attended by other executives who think in much the same terms as they do.

Should Spread Message of Business Needs Among People of Community

If men who attend meetings of this kind would go to the trouble, on returning to their home towns, of telling their fellow citizens, through their local newspapers, or before local gatherings, what went on at those meetings, the average citizen would become more aware that what industry wants is what the country needs—namely, more business, more employment and greater public purchasing power.

There is little doubt that we as a nation will eventually find our way out of our present troubles. This will come when the majority of voters understand clearly just what must be done to make life enjoyable and secure. Much progress already has been made in this direction and the popular feeling toward business is one of greater friendliness. Political officeholders no longer are strafing business. Congress, though fumbling in the matter of initiating correctives, refuses to legislate further business "reforms". Recent polls, for example, reveal that the average voter regards the Wagner act as unfair, so that its eventual revision is assured.

Industrial Leaders Can Hasten Progress by Localizing Problems

Such progress could be hastened materially if industrial leaders made it their business to see that the man-in-the-street knows what will make business "go". They can do a lot along this line by cultivating the newspapermen in their communities and encouraging them to publish details as to how national policies, or other factors that can be influenced by the public, affect the fortunes of the particular community through their effects on business. If the people knew just what causes are responsible for reduced employment or number of working hours, they would know more specifically what to favor and what to oppose when casting their votes. And legislators would have a better understanding as to what was wanted by their constituents.

It is not enough for an industrial executive to run his business efficiently these days. It is also his responsibility to inform the people in his community as to what sort of help he needs in order to provide more employment and contribute in maximum degree to the general welfare of his neighbors.

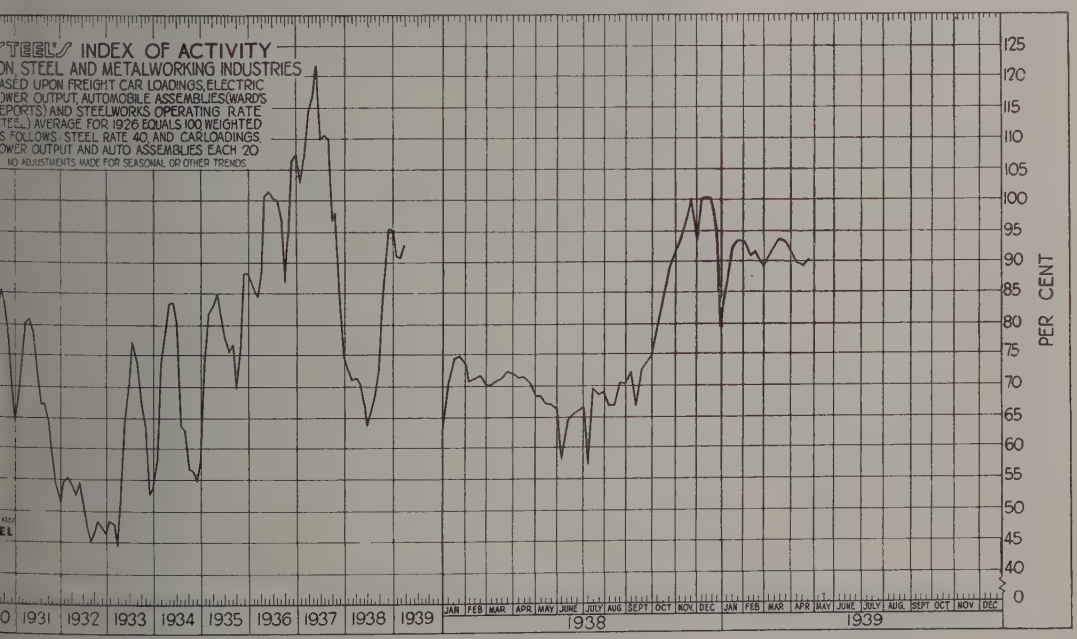
BUSINESS TREND

Index Reverses Downward Tendency

NG gains in automobile production, elec-
ısumption and revenue freight carloadings
ended April 22, STEEL's index of activity
downward tendency of the preceding four
now stands at 90.4, a gain of 0.7 point over
week. Current activity level recorded by
ains substantially above the 70.8 registered
rable week last year. However, compari-
peak last year of 100.7, recorded in the
ec. 10, indicates industrial activity has de-
cent in the past few months.
es in the European situation and disappointing domestic factors, such as lower steel operations and a slowing down in commercial and industrial building, has intensified corporate management's caution in making forward commitments. Of particular concern is the scarcity of private capital financing and corporate investments in equipment, at a time when a tapering off in government pump-priming expenditures approaches.

Steelmaking operations eased 1 point to 50.5 per cent of capacity in the week ended April 22 to record the fifth consecutive weekly decline. Indications are for still lower level operations in the week ended April 29. Excluding the holiday week ended Dec. 31, the present national steel rate is the lowest since the week ended Oct. 8. However, a year ago the steel operations were below the current level at 32 per cent.

Aided by increased production at Plymouth and Dodge plants, automobile output advanced for the third conse-



STEEL'S index of activity gained 0.7 point to 90.4 per cent in the week ended April 22:

1939	1938	Mo. Data	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
90.7	70.9	Jan.	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
92.1	71.2	Feb.	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
91.1	71.9	March	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
89.3	70.3	April	....	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
91.5	70.1	May	....	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2	122.9
92.7	70.8	June	....	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
93.3	71.3	July	....	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
93.2	72.4	Aug.	....	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
92.2	72.0	Sept.	....	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
90.0	71.3	Oct.	....	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8	107.1
89.7	71.4	Nov.	....	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0	92.2
90.4	70.8	Dec.	....	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3	78.3

cutive week to 90,280 units in the week ended April 22, compared with 88,050 in the preceding week and 60,563 units in the same week last year. However, the increase in automobile output the past few weeks has been below seasonal expectations, reflecting the less than seasonal pick-up in retail sales and resultant excessive dealers' stocks.

Revenue freight carloadings recorded a better than seasonal gain to 558,706 cars in the week ended April 22 and compare favorably with the 523,767 cars loaded in the same week last year. Electric power consumption of 2,199,002,000 kilowatt-hours during the week ended April 22 more than regained the loss in the preceding week and remains well above the 1,951,456,000 kilowatt-hours consumed in the same week a year ago.

FAILURES INCREASE IN MARCH

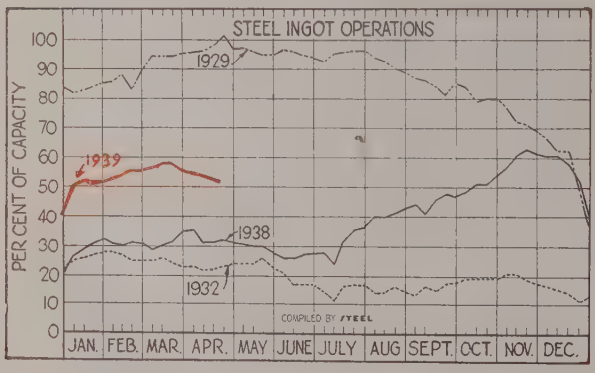
Commercial failures increased in March to 1123, with liabilities of $17,915,000. Failures during March compare with 963 disasters in February, with liabilities of $12,788,000, and were only 3.8 per cent under the 1167 failures recorded in March, 1938, with liabilities of $40,325,000. As compared with February, there were substantial increases in all classifications of business enterprise, but the reduction from March, 1938, was chiefly in the manufacturing division. Divided according to geographical location, the bulk of the increase in fa... over February appeared to be in Chica... Kansas City and San Francisco Federal ...

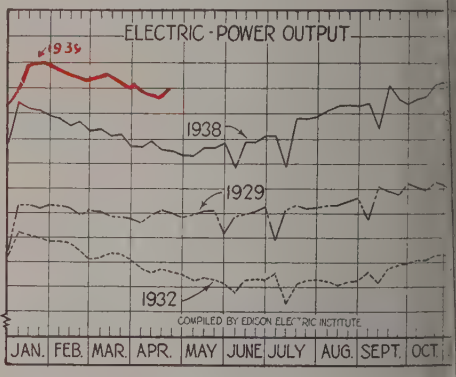
PRODUCTION UNCHANGED DURING ...

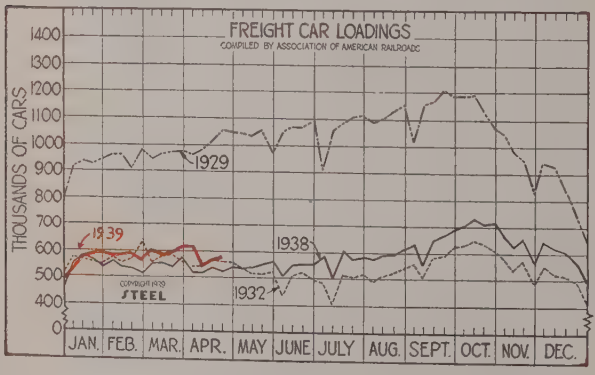
Volume of industrial production show... in March, according to the Federal Rese... sonally adjusted index which remained ... the February level of 98. A year ago th... stood at 79.9. The index for the first q... 99, compared with 101 in the final period ... ufacturing production in April has been about the same rate as in March, but mi... declined reflecting the sharp reduction ... bituminous coal.

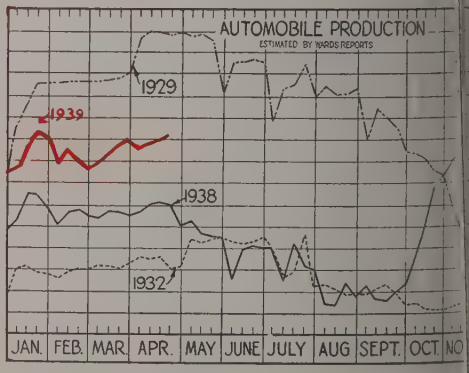
FOUNDRY EQUIPMENT ORDERS GAI...

The Foundry Equipment Manufactu... reports foundry equipment orders for M... peak this year and were the best since ... Net orders for March were indexed at 146 ... in February and 114.6 in March of last y... also rose, lifting the index last month to ... February level of 112.2. A year ago s... indexed at 99.4. Unfilled orders climbe... figure of 193.6 during March from 175.1

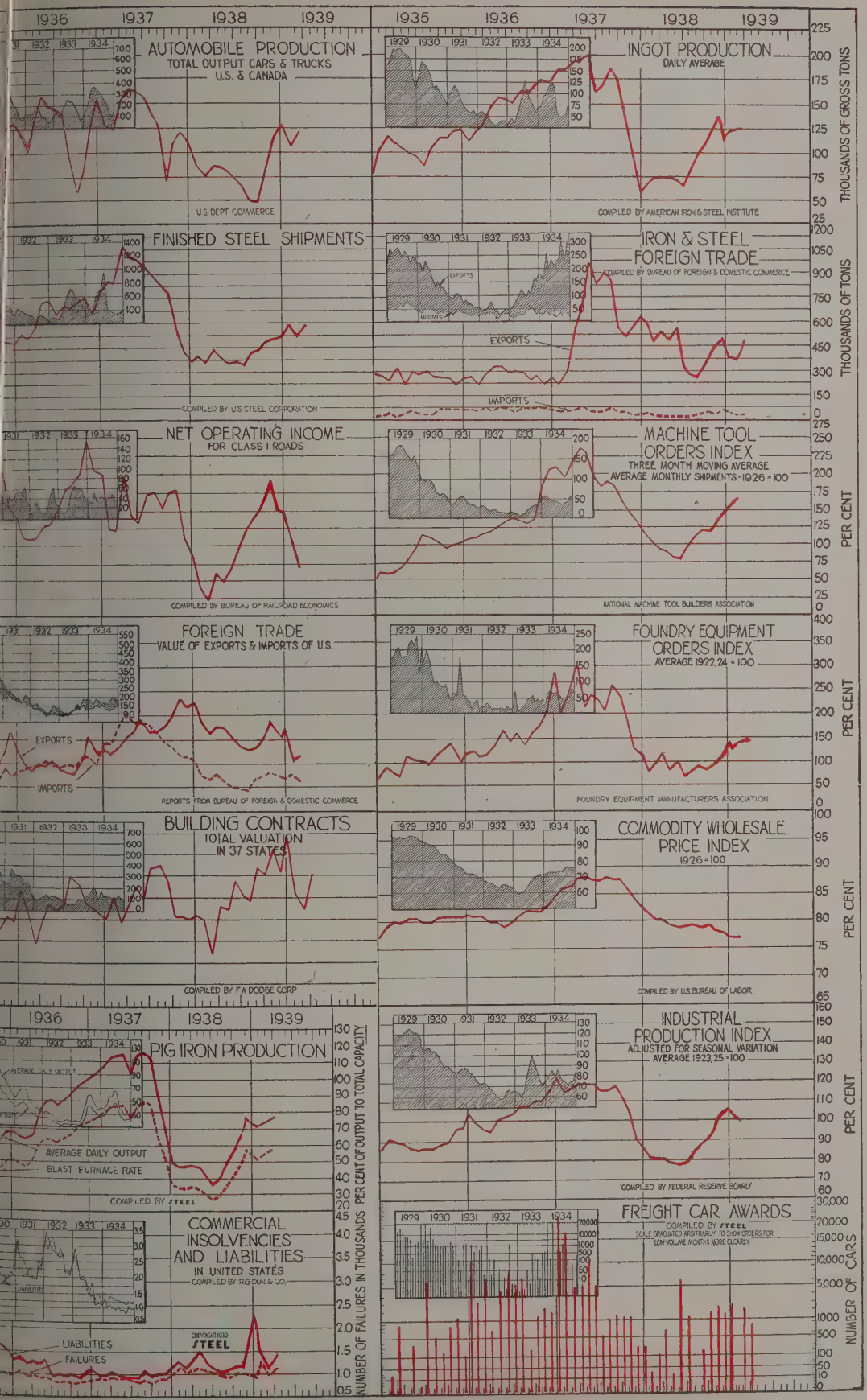








Week ending	Steelworks Operating Rate Per Cent 1939	1938	1932	1929	Electric Power Output Million KWH 1939	1938	1932	Freight Car Loadings Thousands of Cars 1929	1939	1938	1932	1929	1939	Weekly Outp... 1938
Jan. 7	51.5	26.0	25.0	84.0	2,169	2,139	1,619	1,542	531	552	573	799	76,685	54,084
Jan. 14	52.0	29.0	26.0	82.0	2,269	2,115	1,602	1,734	587	580	572	914	86,925	65,735
Jan. 21	51.5	30.5	27.0	83.0	2,289	2,108	1,598	1,737	590	570	562	932	90,205	65,418
Jan. 28	51.5	33.0	28.5	84.0	2,292	2,098	1,588	1,717	594	553	560	926	89,200	59,365
Feb. 4	53.0	31.0	28.5	85.0	2,287	2,082	1,588	1,728	577	564	575	947	79,410	51,443
Feb. 11	54.0	30.0	27.0	86.0	2,268	2,052	1,578	1,726	580	543	562	956	84,500	57,810
Feb. 18	55.0	31.0	25.0	88.0	2,249	2,059	1,545	1,718	580	536	572	958	79,860	59,100
Feb. 25	55.0	30.5	25.0	83.0	2,226	2,031	1,512	1,699	561	512	636	907	75,660	56,977
Mar. 4	56.0	29.5	25.0	89.5	2,244	2,036	1,519	1,707	599	553	560	977	78,705	54,440
Mar. 11	56.5	30.0	25.5	94.5	2,238	2,015	1,538	1,703	592	557	575	946	84,095	57,438
Mar. 18	56.5	32.0	24.5	94.5	2,225	2,018	1,537	1,687	594	540	585	958	86,725	57,558
Mar. 25	55.5	35.0	23.0	94.5	2,199	1,975	1,514	1,683	605	573	561	961	89,400	56,800
Apr. 1	54.5	36.0	23.0	95.0	1,210	1,979	1,480	1,680	604	523	545	967	85,980	57,500
Apr. 8	53.5	32.0	22.0	95.5	2,173	1,990	1,465	1,663	535	522	545	956	87,019	60,975
Apr. 15	51.5	32.0	22.0	96.0	2,171	1,958	1,480	1,697	548	538	567	972	88,050	62,021
Apr. 22	50.5	32.5	23.0	98.0	2,199	1,951	1,469	1,709	558	524	562	1,004	90,280	60,563


1936
1937
1938
1939
AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS
U.S. & CANADA
U.S. DEPT COMMERCE
FINISHED STEEL SHIPMENTS
COMPILED BY U.S. STEEL CORPORATION
NET OPERATING INCOME
FOR CLASS I ROADS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
EXPORTS
IMPORTS
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
BUILDING CONTRACTS
TOTAL VALUATION
IN 37 STATES
COMPILED BY F.W. DODGE CORP
1935
1936
1937
1938
1939
INGOT PRODUCTION
DAILY AVERAGE
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
IRON & STEEL
FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
MACHINE TOOL
ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS-1926 = 100
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
FOUNDRY EQUIPMENT
ORDERS INDEX
AVERAGE 1922-24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
COMMODITY WHOLESALE
PRICE INDEX
1926=100
COMPILED BY U.S. BUREAU OF LABOR
INDUSTRIAL
PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923-25 = 100
COMPILED BY FEDERAL RESERVE BOARD
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR
LOW-VOLUME MONTHS MORE CLEARLY
PIG IRON PRODUCTION
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
COMPILED BY STEEL
COMMERCIAL
INSOLVENCIES
AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES
FAILURES
COPYRIGHT 1939
STEEL
THOUSANDS OF GROSS TONS
THOUSANDS OF TONS
PER CENT
PER CENT
PER CENT
PER CENT
NUMBER OF CARS
NUMBER OF FAILURES IN THOUSANDS
PER CENT OF OUTPUT TO TOTAL CAPACITY

Forum on RE-EMPLOY

Much is being said about increased activity in the building trades. In the realization that there is great need for more and better housing, various governmental agencies have been and are busying themselves to stimulate building—directly through initiation of projects, also indirectly through easing of credit to private builders.

As an experienced interpreter of what the building situation is and can be, and what it means in terms of employment, STEEL presents Marshall Adams, merchandising consultant, Cincinnati and New York. Mr. Adams was for many years advertising and sales promotion manager of Westinghouse Electric & Mfg. Co., and of American Radiator Co. As managing director of the Producers' Council, he recently organized and directed a successful nation-wide campaign to promote building.

Mr. Adams says: "Many of our towns and cities need thorough rebuilding. Many are poorly planned. Many have blighted areas—large areas which for considerations of decency and health—to say nothing of beauty—should not be allowed to exist as they are."

—*The Editors*

■ INCREASE in construction of residential units in 1939 over 1938, will provide jobs for 425,000 men for a year, including construction at the job, fabrication in factories, and production of raw materials in mine, mill and forest. This increase in construction, and the attendant re-employment, is the result of three forces that should be analyzed when considering the problem of re-employment in the construction industry.

The first of these forces is necessity. There are many and varied estimates of the need that exists for new homes and new dwelling units. Few of them mean anything to the average man, but all of us know that there are fires, tornados, and also disintegration that comes with age and wear and tear. These things have been going on at their usual rate in the last ten years, while new construction has been going on at a reduced rate. Hence there is a tremendous potential of employment in the need for new and renovated structures.

Probably the strongest of these forces for re-employment in the building industry is the favorable financing situation. Never in the history of this country has it been as easy to finance new construction and remodeling, nor have money rates been so low and terms so easy.

Under provisions of the National housing act and under arrangements made independently by financial institutions, money for repairs is available almost everywhere at a time payment rate approximately two-thirds the rate of other days. With a down payment as low as ten per cent the transaction may be financed over a period of at least three years, and in some cases five.

Thousands of banks have learned that the "small man" with a good credit rating and abil
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"Package" Home A

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not Promote Housing

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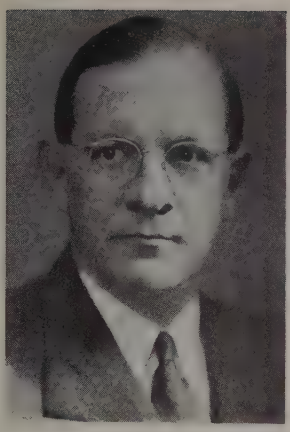


©*Bachrach*

Marshall Adams
Merchandise Consultant
Cincinnati

the vision and merchandise to the public the idea of home ownership —in other words the completed product. The reason why they have not done this becomes obvious when the facts are examined.

In the first place there are no large national manufacturers in a position to furnish all materials and equipment for a complete home. Even if there were, the fact still remains that at least half of the selling price of a house is represented in land cost, labor on the job, selling cost and profit. Even in the case of a complete wooden structure, parts like windows, doors and millwork have different sources other than those of the raw lumber, while the bath, kitchen and heating equipment comes from without that industry.

Furthermore, among large manufacturers of building material and equipment there are few if any whose interests are primarily in the building field. In the case of one of the largest manufacturers of building material, nearly 70 per cent of sales are in the industrial field. In the case of one of the largest manufacturers of equipment for buildings, total sales of material in this field represent only about 35 per cent of its business. Attention that these manufacturers give to the building field naturally is only in proportion to their sales possibilities in it.

To make a long story short, the present practical approach to creating re-employment by increasing construction and remodeling in the building field should begin by recognizing the essentially local nature of the building industry. This has possibilities of development while other situations are evolving. Initiative for building comes primarily from a person or group of persons wishing to modernize; build and occupy; build and sell; or build and rent a building. The only others whose interests are definitely affected are other citizens of the community in which the initiative is taken. Therefore the group behind which it seems most practical to mobilize in a move to create jobs in the building field, is that included in a town, city or a trading area.

Many of our towns and cities need thorough rebuilding. Many are poorly planned. Many have "blighted areas"—large areas which for considerations of decency and health—to say nothing of beauty—should not be allowed to exist as they are. But most important of all is the overall interest of residents of the community. The clearing up of such situations will benefit everyone through the tremendous local turnover of dollars incidental to buildings and remodeling activities.

Many Jobs Can Be Created

It has been reported that in one city of about 450,000 there are 78,000 persons more or less dependent on the building industry. If this city were faced with the possibility of attracting a factory that would employ 5000 people, the chamber of commerce, luncheon clubs, newspapers and banks would all co-operate in going after it. But this same city has no organized program for keeping workers in its "building factory" busy.

Everyone is familiar with the "Clean Up—Paint Up" campaigns inaugurated several years ago, particularly in small towns. Few are familiar with the fact however that these same campaigns were put on in at least 7000 towns in 1938. While there is little comparison between a "Paint Up—Clean Up" campaign and a "Rebuilding Program" for a town or city, they have demonstrated that once educational work has been done and benefits of a community activity have been felt, it takes comparatively little push to keep it going. Communities build parks, libraries, municipal buildings. Why not rebuild themselves?

Since there is no existing national leadership of an industry character in these matters, it remains for each individual community to consider its own employment problem and the possible effect of a "Rebuilding Program" on it and upon its general prosperity. While it is unlikely that there will be any national movement in this connection, it is very likely that any community actively exploring the subject will receive the active support and co-operation of those national factors which are loosely spoken of as composing the non-existent building industry.

This 40-ton gantry crane is primed with zinc-dust zinc-oxide paint and finished with aluminum

Zinc-Dust Pa

For Improved Maintenan
of Metal Surfaces

Due to a galvanic action similar to that by zinc galvanizing, zinc-dust paints d formation. Their excellent distensibili adherence and high hiding power ma valuable as a protecting finish for all i steel surfaces

■ MILLIONS of dollars are spent annually for maintenance of metal buildings and outdoor metal structures. Zinc-dust paints have shown definite economy when used on such applications. These paints are formulated with metallic zinc powder, a gray pigment distilled in furnaces specially designed and operated for its production. This powder weighs 58.81 pounds per solid gallon and is in so fine a state of subdivision that 99 per cent of standard zinc dust, No. 22, will pass through a 325-mesh screen.

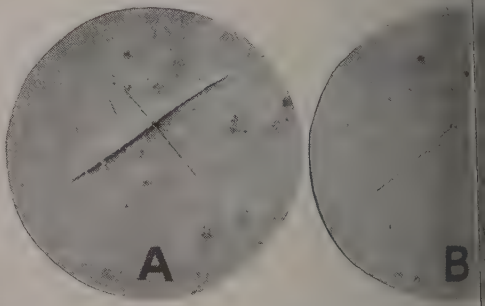
Desirable applications include galvanized iron, steel and zinc sheet, shop coating of structural steel and iron, protection of smokestacks and hot surfaces in general, as primers under aluminum and other types of finishing paints, and in combination with aluminum where the sheen of aluminum and the rust inhibitive properties of zinc dust produce an excellent one-coat job.

Zinc galvanizing actually prevents rust formation due to the galvanic action it exerts. This same characteristic of zinc in galvanizing is present in some degree in connection with zinc-dust paint.

The excellent plastic properties of zinc dust paint film after exposure for one year is demonstrated in accompanying illustrations where A shows a cut in paint film typical of that in a plastic material, and B shows paint film mole place and the cut prac This shows how zinc d tain their distensibl Properly formulated, z film has slight chalkir drives to a firm film color, is not "tacky" sheds dirt well, and d or crack even after p posure.

These paints have ing power and high sp One coat obscures a b any color with an attr ship-gray finish. Con amounts of other pigm added without materi

Abstracted from material for a booklet to be published jointly by New Jersey Zinc Co., New York, and paint manufacturers.



Above, A shows cut typical of that in a plastic material. B shows paint film molded back into place and cut practically healed. Both after one-year's exposure. Left, Railway Express Agency, one of world's largest fleet owners, has standardized on zinc-dust paint to prime the galvanized steel outsides, insides, tops and understructures of its more than 10,000 delivery trucks

wer. They have a rate, one gallon cov- re feet or more.
epared zinc-dust applied by brush or . Their nontoxic na- rly commends them lication.
otective paint for gal- nd steel surfaces re- ating be distensible this property over exposure to weather- must adhere uniform- to the galvanized sur- st paints meet these well, especially due to etween the zinc dust surface of the gal- material.
iron and steel sur- arly must be efficient s if low maintenance Exposure tests with nts have resulted in onstration of the ex- c dust paints for this

, surfaces allowed to n inordinately long pe- require only moderate and cleaning for re- here most protective er such conditions, e extensive chipping, ing and other prepara- epainting, the zinc-dust practically no mechan- on over that of mere- ne surface.

or Shop Coating

coat for structural and d steel work, zinc-dust ar particularly ideal. op coat of paint is o protect the surfaces ng periods of time, up s in many instances. me, the paint must ex- ly high exposure to ut great abrasive re- o it must protect bared orrosion if the surface ded.
finish painting is done, must serve as an ef- r and anchor for the oats. Actually, quali- op coat directly deter- and durability of the So its importance is

growing rapidly in use aints for shop coating th the 80 per cent zinc ent zinc oxide as well cent zinc dust, 30 per ide, 20 per cent zinc

inum paint on rolling Antonio, Tex., is exposed ring and abrasion. Photo ear Mfg. Co., Colum- bus, O.

oxide paints lend themselves to shop coat formulations.

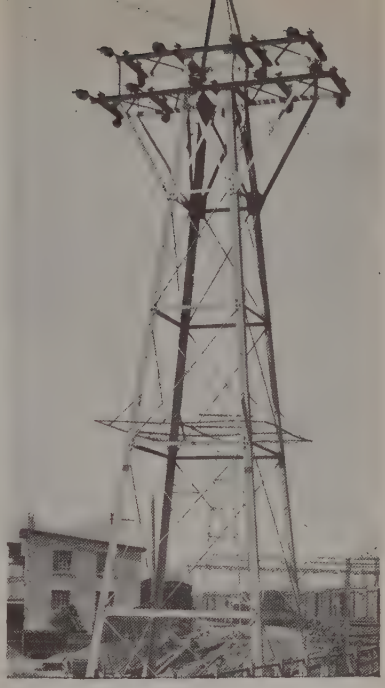
In a series of tests on three I-beams to compare protective properties, red lead was found to give a value of 12 months; iron oxide, zinc oxide 19 months; and zinc dust, iron oxide, zinc oxide gave more than 24 months. This was the time that elapsed before extensive scratch brushing was indicated as being necessary before repainting.

Forms Galvanized Coating

Zinc dust incorporated in the softer, heat resistant types of quick-drying resin vehicles, particularly those of the alkyd variety, provide a particularly adherent and protective coating for hot surfaces. Where some vehicles disintegrate causing embrittlement of the paint and subsequent flaking, zinc-dust paints tend to maintain their distensibility for a long period of time. In fact, after exposure to heat has disintegrated the vehicle, zinc dust continues to adhere firmly to the original metal due to the fact that under these elevated temperatures the zinc dust actually forms a galvanized coating.

Zinc-dust paints appear a most satisfactory primer for aluminum paints and other types of finishing coats. Zinc-dust paint is sufficiently flexible to contract and expand with the metal as well as to afford excellent anchorage to subsequent coats.

While aluminum paint is used as a finish coat for metals essentially because of the sheen it imparts to the finished job, it is recognized that it does not have particularly good rust inhibitive properties. Aluminum is recommended for application over a good rust inhibitive primer. Characteristics of zinc dust paints appear particularly suitable for a primer under aluminum finish paints, whether on sheet steel, black iron or galvanized surfaces.



Zinc-dust paint is widely used in electric power line equipment

When zinc-dust paints are used on building structures, it sometimes is desirable to color the paint to meet different appearance requirements. Since metallic zinc dust possesses exceptionally high hiding power but low tinting strength, zinc-dust paints can be tinted with addition of only a small amount of colored pigment in a wide range of attractive colors, as well as black, while retaining the metal protective features of both the zinc dust and zinc oxide. Such colored zinc-dust paints may be used as self-primer two-coat systems, thereby attaining all the desirable properties of zinc, paint or as a one-coat job to obtain both the desired color effect and the rust inhibitive properties combined.

Such paints are excellent from

(*Please turn to Page* 78)

Open-Hearth Bottom

New bottom shows no expansion during heati up time and break-in periods. Savings in stallation cost and furnace time total 48.4 cent compared with recent installations of c ventional type. During one week, makes 19 he averaging 8 hours, 45 minutes from tap to and 15.43 gross tons per hour

By ALEX M. MORTON
Superintendent Construction
Pittsburgh Steel Co.
Monessen, Pa.

■ AT PITTSBURGH STEEL, a more refractory bottom has been installed to provide complete drainage of non-ferrous as well as ferrous metals and slag from the hearth, thereby reducing the possibilities of injurious bottom boils as well as installation cost compared with a conventional bottom. Such a bottom was installed in No. 5 open hearth furnace, lit Dec. 9, 1938. It completed its run April 8, 1939.

The brick subhearth on this furnace was constructed as an inverted semielliptical arch that conformed to the general lines of the conventional bottom, with a drop of 6 inches from end slopes to the tap hole and 2 inches from front to back. The magnesite working hearth was 2 inches thick on banks and bottom. Tap hole was constructed as its bottom conformed to surface of brick in the subhearth. This permits complete drainage.

Subhearth consists of a 3-inch layer of insulation followed by 12½ inches of clay brick, a 9-inch soldier course of chrome brick, and a 9-inch soldier course of chrome-magnesite brick. Both the chrome and chrome-magnesite brick are of bonded ring construction with a dipped and rubbed joint. Base for the finished contour of the bottom was cut out in the clay brick, 18 inches below the finished line to allow for the two rings of basic brick. All brick used was standard 3-inch series, laid in special chrome cement. No allowance was made for expansion in any part of the hearth.

Abstracted from paper presented at Open Hearth and Blast Furnace conference, Cleveland, April 26-28.

Elapsed time for heating up and burning in of hearth is shown in Table I.

Table I

Heating up with wood fire	35 hr
Heating up with gas on	18 hr
Total time heating up	54 hr
Burning in grain magnesite	48 hr
Total elapsed time from cold furnace to charge	102 hr

During the heating-up time and burning-in periods, absolutely no expansion could be detected in any part of the hearth.

Table II

	Per Cent
Silicon	2.64
Ferrous Oxide	7.74
Ferric Oxide	8.01
Aluminum Oxide	3.61
Calcium Oxide	1.10
Magnesium Oxide	77.64

Material used in burning-in the bottom included 26,000 pounds of 86-per cent magnesite and 3675 pounds of 14-per cent bar-mill scale for the bottom, with 26,000 pounds of magnesite for the banks.

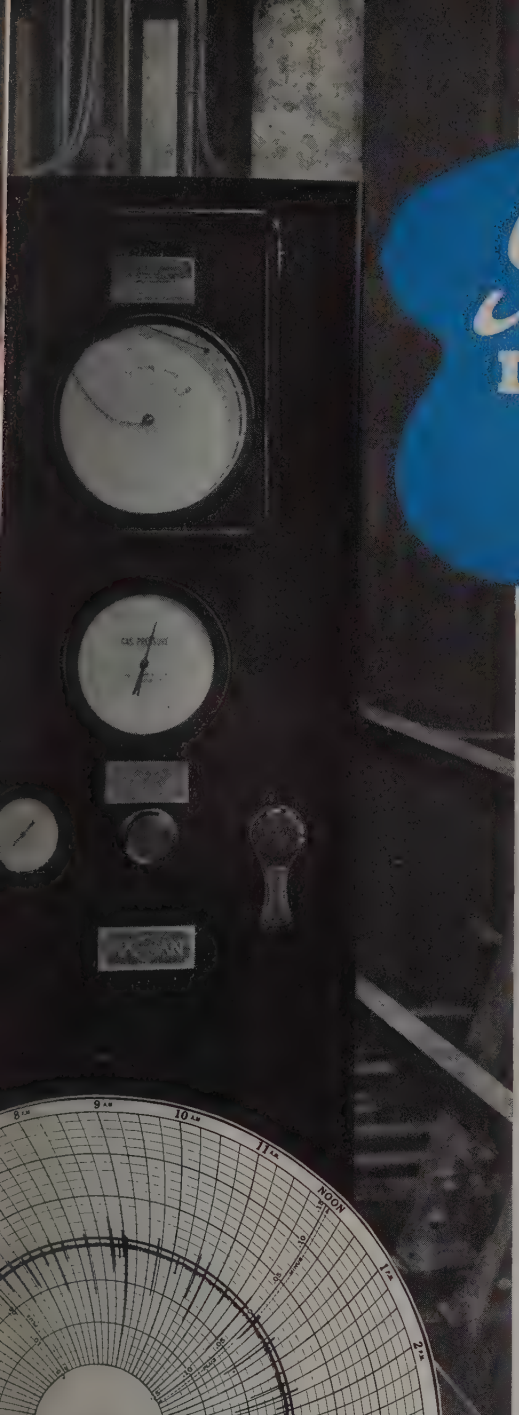
Both magnesite and mill scale were ground together in a dry pan so all the first shot p No. 20 mesh, and sub averaged approximate fines. It was planned bottom and banks wit to an even depth of 2 ever, during the heat the brick ribs on the f banks spalled, leaving for the first shot which slipped further banks than was intend peated attempts at bu banks, it was decided t the bottom and to banks with part of t in the furnace. Th proved successful and 26,000 pounds of n shown above, was u work.

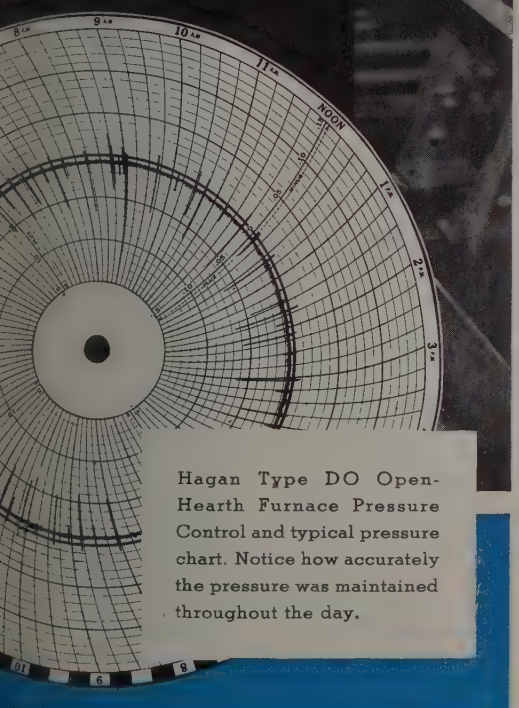
Cores taken from t and bottom during t period appeared whe somewhat lacking in b with samples taken i in the past, which in large percentage of

(*Please turn to F*

Table III

Total number of heats	
Average gross tons per heat	
Total tonnage for run (gross tons)	
Gross tons per hour, tap to tap	
Gross tons per 1000 square feet of hearth area	
Yield, per cent	
Charge { Hot metal, per cent	
Charge { Scrap, per cent	
Average time per heat, bottom delay for run	
B.T.U. per gross ton of ingots, using producer gas	





Hagan Type DO Open-Hearth Furnace Pressure Control and typical pressure chart. Notice how accurately the pressure was maintained throughout the day.

Saves $13 a day!

INCREASES TONNAGE 5%

Hagan Open-Hearth Furnace Pressure Control paid for itself in 65 days

WHERE can you make a better investment than that? Or earn a quicker return on your money? If you need this control and are not using it, you're paying for it over and over again through increased production costs.

Hagan Automatic Furnace Pressure Control was installed on an open-hearth furnace in a large steel mill in the Pittsburgh district. Tonnage was increased approximately 5% per hour due to more even operation. Savings in fuel alone amounted to more than $13 a day. At this rate the equipment would pay for itself in 65 days and in a short time pay for all installation costs. Uniform furnace pressure day in and day out helped assure uniform quality steel—at reduced costs. Similar results are being obtained from Hagan Control installations in numerous other mills.

Hagan also makes dependable, accurate control for soaking pits, slab and billet heating furnaces and any other application where the control of furnace pressure, fuel-air ratio and volume are important problems. Our engineers will welcome an opportunity to look over your mill and make recommendations that will lead to lower production costs. Write or call.

HAGAN CORPORATION

300 Ross Street **Pittsburgh, Pa.**

Offices in Principal Cities

Automatic COMBUSTION CONTRO

Base Confidence on Peace-Time Activities

(*Concluded from Page* 35)

will not hesitate to purchase expensive machine tools suited to handle its difficult and exacting machining operations, Mr. Ward—with the help of motion pictures and slides—went into detail on these operations. Cutting speeds of 700 to 800 feet per minute are common on duralumin parts, 200 feet per minute being employed successfully on harder materials. Grinding limits within 0.0002-inch and machining limits within 0.0005-inch are demanded on many of the parts.

No finer aircraft engines are being built anywhere in the world today, said Mr. Ward, than are being manufactured right here in the United States. European experts are flocking over here to find out how it is done. Quality of American engines is due to a great extent to the fact that accurate fit and complete interchangeability of parts is made possible—without any hand finishing and fitting—by the latest developments in the American machine tool industry.

Other speakers during the convention included: Tell Berna, general manager of the association, Cleveland, who in the absence of B. P. Graves, director of design, Brown & Sharpe Mfg. Co., Providence, R. I., also read the latter's paper on "Electrical Motor and Control Application to Machine Tools;" T. Heberton Doan, president, Foote-Burt Co., Cleveland; L. W. Scott Alter, president, American Tool Works Co., Cincinnati; Walter W. Tangeman, vice president, Cincinnati Milling Machine Co., Cincinnati; William E. Kelly, president, Machinery and Allied Products institute, Chicago; and Charles J. Stilwell, newly elected president, Warner & Swasey Co., Cleveland.

Industrial Architecture Joins Beauty, Efficiency

■ *Industrial Architecture of Albert Kahn Inc.*, by George Nelson; cloth, 176 pages, 9 x 12 inches; 200 illustrations, diagrams and floor plans; published by Architectural Book Publishing Co. Inc., New York; supplied by STEEL, Cleveland, for $6; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London S W. 1.

Factory building of the last century has become industrial architecture today. This has resulted from higher aesthetic standards and also from fundamental changes within the factory itself.

This volume presents some 60 case histories, the basic problem of each stated in brief and simple terms and text and illustrations presenting the solution. Many details evolved by Albert Kahn Inc. are shown, how to decrease construction costs while increasing the efficiency of buildings. Emphasis is placed on the fact that it is possible to construct an attractive and skillfully planned factory at n... than an unattractive, ...

The volume is of ... architect, the enginee... dustrialist, showing ... tural beauty and effi... are combined. The il... of the highest class ... format is attractive. ... tion of industrial arch... sented, full of sugges... interested in construct...

Issues Code Fo... Overhead Track...

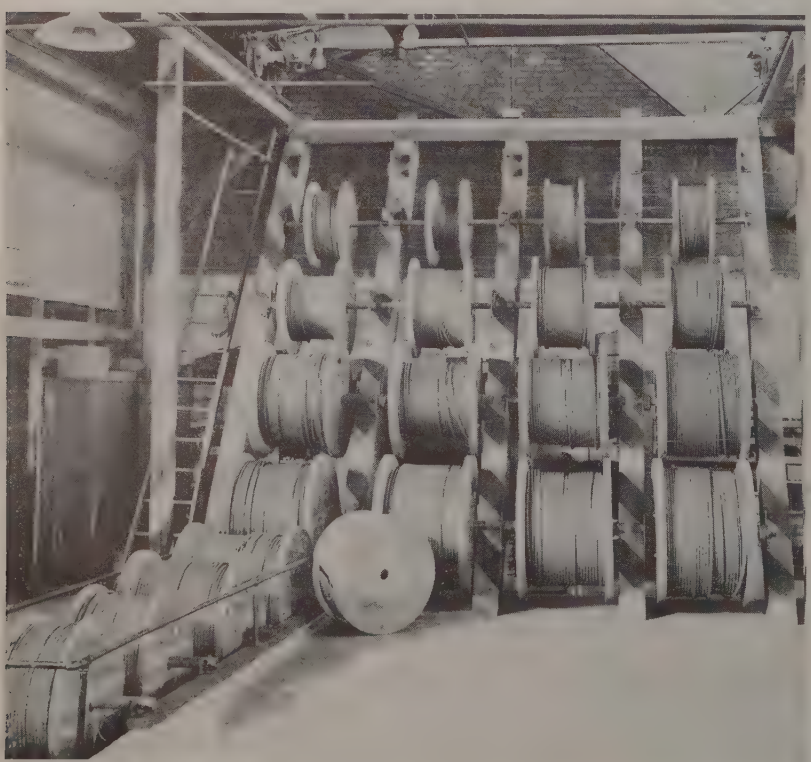
■ Monorail Manufact... tion, 165 Broadway, N... published a leaflet, ... For Overhead System... ers the following: E... (referring to contract... pension fittings, manu... trolleys or carriers, sw... and transfer bridges, ... or lift-out links, elect... lector wheel or shoes, e... electric hoist and tra... wiring and guarantee. ... hoist section complies ... cations issued by the ... Manufacturers associa... may be had by reques...

Novel Storage F...

■ How W. T. Walsh Ec... Cleveland, simplified ... stock of wire ropes is ... a recent issue of *The Y*... house organ of the Bro... com Rope Co., St. Loui... in the accompanying i... specially constructed s... permits tiering of reels ... ner that each is in pos... mit cutting of desire... rope with a minimum ... the part of the operato...

A simple arrangemen... overhead crane equippe... block makes lifting and... reels a light task. A r... merly used for autom... work, adjoins the rack ... additional storage spa... good sized reels.

Among the advanta... by this novel arrangem... following: Rope may ... out danger of kinking; e... be handled without dis... other reel; floor space i... and greater all-around ... efficiency are attained. ... are painted in barber-p... which lends a colorful a... touch to the storage dep...



This arrangement of wir... may suggest possibilitie... with similar storage han... lems. Crane and chain h... heavy lifting

olve a Tough Problem and Save Money y Preventing Oil Drip

Removing waste lubricant from steel sheets is a costly nuisance. You won't have this problem if you change over to NON-FLUID OIL. Drip-less and waste-less—NON-FLUID OIL stays in bearings until entirely consumed.

ts use on overhead bearings particularly—and on bearings generally not nly protects metal from oil showers, but saves money. NON-FLUID OIL lasts longer and needs less frequent application.

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MODERN STEEL MILL LUBRICANT

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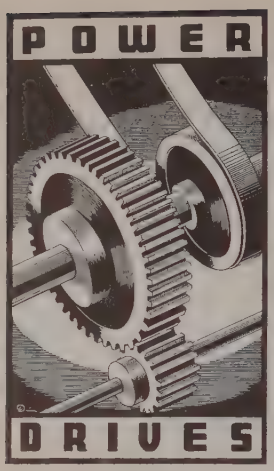
Providence, R. I. Detroit, Mich. Chicago, Ill. St. Louis, Mo.



Flat Belt Ratings

Horsepower ratings for oak tanned, flat leath belting officially adopted by American Leath Belting association, Dec. 8, 1938, are presente here. Tables include factors to cover atmospher conditions, type of service, kind of pulley materi

By L. H. SKOUGOR
Research Engineer
American Leather Belting
Association
New York

UNIVERSALLY recognized and authoritative data on flat leather belt capacities has been established by the American Leather Belting association to fill a long felt need for this important information.

In the past, the user and purchaser of flat leather belts has been left entirely on his own in designing belting for his individual applications. Few millmen have had the time and facilities to segregate from the numerous possible sources what could be considered a reliable and yet economical basis for leather belt ratings. Existent information in many instances was at some disagreement as to what constituted good belting practice. Theories set forth by older sources of information in many cases have been revised and disproved through practical application.

These new tables now make it possible for the designer and purchaser to set up his own specifications rather than segregate them from a number of recommendations. American Leather Belting association tables are based on the performance of modern and up-to-date belting. They are not based on one particular authority's theory but are a correlation of scientifically measured tests and field data.

Table I lists horsepower transmission capacities for belts 1 inch in width at a varying speed, with the same given large-size pulley throughout the tests. The tests were run at Cornell University by Ralph Jones on most up-to-date and modern equipment. All variables were measured carefully rather than attempting to use any theoretical shortcuts or computations. It was a surprising thing that many of the existent formulas and theories concerning these variables were found to be inaccurate when checked against actual measurements. The figures in this table do not represent peak load ratings, but are based on proper tensions and factors of safety. Thus, when corrected through the factors in Tables II and III, a properly designed drive will result. It will be no horsepower transmitted width increases with the belt.

With the work in T pleted, it was necessary a factor to compensate ables introduced, such the effective area. tests therefore were ru ing pulley diameters a center distances resultin rection factors shown

Table I. Horsepower Per Inch of Width

Belt Speed Feet Per Min.	SINGLE PLY *11/64" Medium	SINGLE PLY *13/64" Heavy	DOUBLE PLY *18/64" Light	DOUBLE PLY *20/64" Medium	DOUBLE PLY *23/64" Heavy	TRI *30/64" Mediur
600	1.1	1.2	1.5	1.8	2.2	2.5
800	1.4	1.7	2.0	2.4	2.9	3.3
1000	1.8	2.1	2.6	3.1	3.6	4.1
1200	2.1	2.5	3.1	3.7	4.3	4.9
1400	2.5	2.9	3.5	4.3	4.9	5.7
1600	2.8	3.3	4.0	4.9	5.6	6.5
1800	3.2	3.7	4.5	5.4	6.2	7.3
2000	3.5	4.1	4.9	6.0	6.9	8.1
2200	3.9	4.5	5.4	6.6	7.6	8.8
2400	4.2	4.9	5.9	7.1	8.2	9.5
2600	4.5	5.3	6.3	7.7	8.9	10.3
2800	4.9	5.6	6.8	8.2	9.5	11.0
3000	5.2	5.9	7.2	8.7	10.0	11.6
3200	5.4	6.3	7.6	9.2	10.6	12.3
3400	5.7	6.6	7.9	9.7	11.2	12.9
3600	5.9	6.9	8.3	10.1	11.7	13.4
3800	6.2	7.1	8.7	10.5	12.2	14.0
4000	6.4	7.4	9.0	10.9	12.6	14.5
4200	6.7	7.7	9.3	11.3	13.0	15.0
4400	6.9	7.9	9.6	11.7	13.4	15.4
4600	7.1	8.1	9.8	12.0	13.8	15.8
4800	7.2	8.3	10.1	12.3	14.1	16.2
5000	7.4	8.4	10.3	12.5	14.3	16.5
5200	7.5	8.6	10.5	12.8	14.6	16.8
5400	7.6	8.7	10.6	12.9	14.8	17.1
5600	7.7	8.8	10.9	13.1	15.0	17.3
5800	7.7	8.9	10.9	13.2	15.1	17.5
6000	7.8	8.9	10.9	13.2	15.2	17.6
Minimum Pulley Diameters — Belts Under 8" Wide	3"	5"	6"	8"	12"	20"
Minimum Pulley Diameters — Belts 8" and Over Wide	5"	7"	8"	10"	14"	24"

These are the minimum allowable pulleys for the above thic

*NOTE: See Table IV.
For Belt Speeds over 6000 feet per minute, consult a leather belting ma

Table II. Correction Factor for Center Distance and Small Pulley Diameter

	Center Distance in Feet													
to 4'	6'		8'		10'		12'		15'		20'		25' and Over	
nt Side	Tight Side		Tight Side		Tight Side		Tight Side		Tight Side		Tight Side		Tight Side	
e Below	Above	Below	Above	Below	Above	Below	Above	Below	Above	Below	Above	Below	Above	Below
.45	.46	.47	.47	.48	.47	.49	.48	.50	.49	.52	.48	.54	.48	.55
.53	.54	.55	.55	.57	.56	.59	.57	.61	.58	.63	.59	.65	.59	.66
.59	.60	.62	.62	.64	.63	.66	.63	.68	.65	.70	.66	.72	.66	.74
.62	.63	.65	.65	.68	.66	.70	.67	.72	.68	.74	.69	.76	.70	.78
.66	.67	.69	.69	.72	.70	.74	.71	.76	.72	.78	.73	.80	.74	.82
.68	.70	.71	.71	.74	.73	.77	.73	.79	.75	.81	.76	.83	.77	.85
.70	.72	.74	.73	.77	.75	.79	.76	.81	.77	.83	.78	.86	.79	.88
.73	.74	.76	.76	.79	.77	.82	.78	.84	.80	.86	.81	.89	.82	.91
.75	.76	.78	.78	.81	.79	.84	.80	.86	.82	.89	.83	.91	.84	.93
.77	.79	.81	.81	.84	.82	.87	.83	.89	.85	.92	.86	.94	.87	.96
.79	.81	.82	.82	.86	.84	.89	.85	.91	.87	.94	.88	.96	.89	.98
.80	.82	.84	.83	.87	.85	.90	.86	.92	.88	.95	.89	.98	.90	1.00

ravity idler and pivoted motor drives with tight side of the belt next to the pivot point as having 25 foot pivot base drives where tight side of the belt is away from the pivot point, do not use these tables but ther Belting manufacturer.

lso were run through s rather than using cal formulas or short vet scientific series of ll be noted that when ls and pivoted motor sed it was found that r center line distances nd over can be substi- e effect of controlled pivoted bases and in- tive area of the gravity

up Tables II and III as actors, a more concise table is the result. The ls of various industries uce adverse conditions e taken into considera- values cannot be ex- factors as represented ry test.

sary to belt a drive for ds that will be encount- ered. The nameplate rating of a motor is not always a true indication of the peak loads that may be met. Correct overload capacity and torque characteristics of various motors are not always available to the millman. To insure against under-belting and premature belt failure, overload ratings of the motor, atmospheric conditions, service, etc., must be brought into the calculation to assure satisfactory belt performance. It is fully realized that conditions may exist in isolated cases which may not be covered by these tables. Exceptions must be made in those instances.

It is important that in no instance should a belt rating be taken from any one table without using the proper correction factors from the other two tables to compensate for the individual conditions surrounding the particular application.

Example No. 1

Problem: Select belt for following drive: Motor, 10 horsepower, line start, induction type; pulley 6 inches diameter x 6¾ inches face, fiber; compressor, started automatically against pressure; pulley 30 inches diameter x 6½ inches face; conditions, tight side of belt below, pulleys 6 feet center to center, center line approximately horizontal, important refrigeration service, normal atmospheric conditions.

Selection of factors: Belt speed 6 x 3.14 x 1750/12 = 2750 feet per minute; from Table I, light double belt suited for 6-inch diameter pulley; from Table I, light double belt will transmit 6.7 horsepower per inch of width at 2750 feet per minute; from Table II, factor for center distance and small pulley diameter is 0.65; from Table III, atmos-

(*Please turn to Page* 77)

ble III. Service Correction Factors

ic	Clean, scheduled maintenance.. 1.2 Normal ..... 1.0 Oily, wet or dusty..... .7
ine	Horizontal to 60 deg. from horiz'l 1.0 60 to 75 deg. from horizontal.. .9 75 to 90 deg. from horizontal.. .8
terial	Fiber on motor and small pulleys 1.2 Cast iron or steel 1.0
	Temporary or intermittent..... 1.2 Normal ..... 1.0 Important or continuous 8
	Light, steady load such as: Steam engines, steam turbines, Diesel engines, and multi-cylinder gasoline engines 1.0
is	Jerky loads, reciprocating machines such as: Normal starting torque squirrel-cage motors, shunt wound D. C. motors, and single cylinder gasoline engines 8
	Shock and reversing loads, full voltage start such as: Wound rotor (slip ring) motors, synchronous motors 6

Table IV. Thickness Specifications for Flat Leather Belting

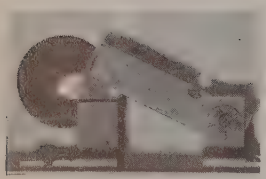
Approved and Adopted by American Leather Belting Association

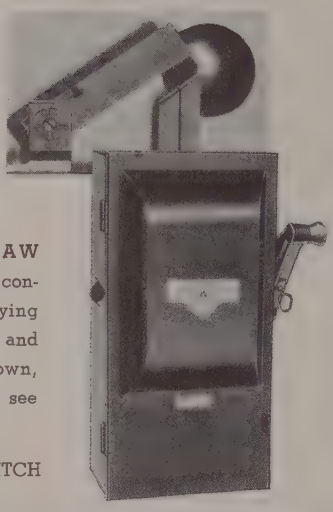
Medium, Single Ply, 11/64" Average	"All thicknesses in this table are average thickness in inches, and should be determined by measuring 20 coils and dividing this total by the number of coils measured. In rolls of belting containing less than 20 coils, the average thickness should be determined by measuring all the coils in the roll. Allowable tolerances for all thicknesses plus or minus 1/64th-inch from above averages."
Heavy, Single Ply, 13/15" Average	
Light, Double, Ply 18/64" Average	
Medium, Double Ply, 20/64" Average	
Heavy, Double Ply, 23/64" Average	
*Medium, Triple Ply, 30/64" Average	Uniformity: No point in single belting shall be more than 3/64" thicker or more than 2/64" thinner than the average thickness. With doubles, the tolerances shall be 2/64" thicker or thinner than the average.
*Heavy, Triple Ply, 34/64" Average	

*Triple Ply: These are averages for general usage. Most triple ply belts are usually constructed for particular drive conditions. *Tolerances for Single and Double Ply Belts do not apply.* Consult a Leather Belting Manufacturer for specific information concerning thickness and construction of 3 Ply Belts.

KEEP ABREAST OF NEW DEVELOPMEN

IN WESTINGHOUSE MOTORS AND CONT

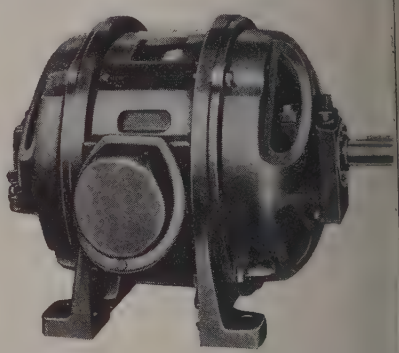




DIAMOND POINTED JAW WITH EXTENDED BLADE confines arc to noncurrent carrying areas . . . eliminates burning and beading. Saves dressing down, saves maintenance. Ask to see it demonstrated.

WESTINGHOUSE SAFETY SWITCH

EXTRA STRENGTH AT NO EXTRA COST I INGHOUSE MOTORS... Extra electric strength i Insulation, extra mechanical strength in rigid one pi Ball or sleeve bearings free from lubrication grief.

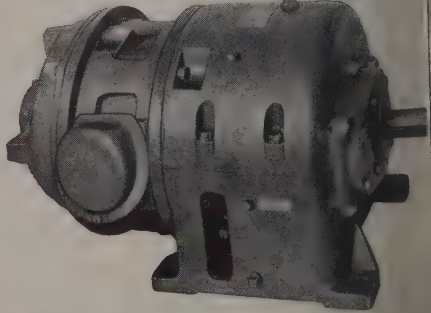


ALL NECESSARY CONTROL AND PROTECTION IN ONE EASILY INSTALLED PACKAGE... The Westinghouse Combination Linestarter . . . Costs less to install . . . saves wiring, conduit, labor . . . simplifies inspection.

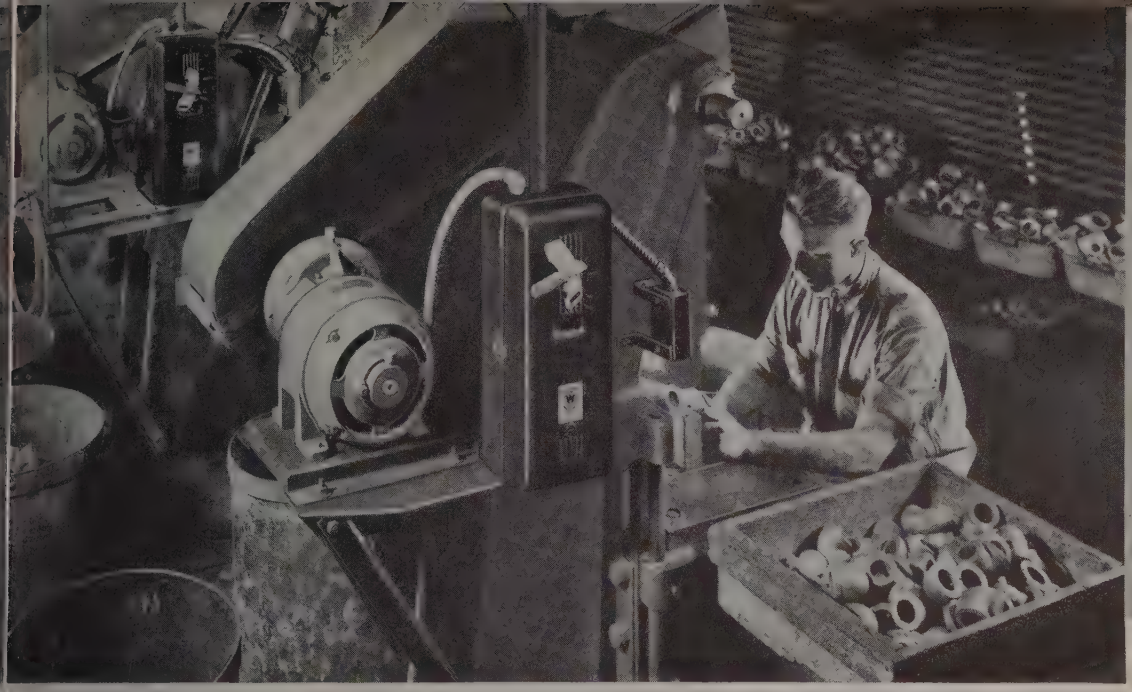
★ ★ ★

WESTINGHOUSE COMBINATION LINESTARTER

HIGH SPEED MOTOR EFFICIENCY FOR SLOW MACHINES . . . Now you can get the horsepower at the rpm. of the driven machine. Saves cost of mechanical units . . . simplifies installation, saves mai of belts, pulleys, sprockets or chain.



Westinghouse



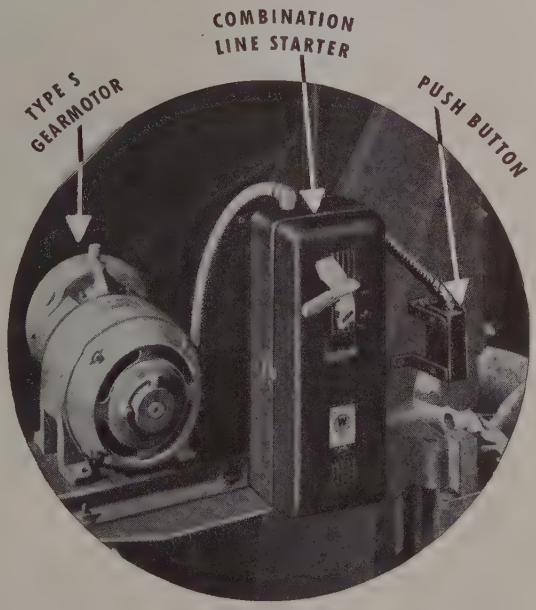
...res Two Thirds in Installation Cost

...GETS MODERN, COMPACT ...Y OF MOTOR AND CONTROL

...nufacturer in Pennsylvania planned to re-...his production to eliminate lifting and hand-...parts — ironing out the wrinkles in the ...ction line. Lineshafts were centered in the ...ground to hook these straightening machines ...lineshafts meant added expense.

...Westinghouse gearmotors and Combination ...starter control solved the problem . . . at one ...of his estimated expense. Each machine is ...individually driven and controlled, and located ...independent of any other drive.

...The simplicity and compactness of the ...motor application. It delivers the required ...power at slow speed with 98% of the effi-...ency the motor would have at standard speed. ...Also, how pushbutton start and stop is at ...operator's finger tips — how in one unit, ...mounted on the machine the Combination Line-...starter provides fuseless circuit protection, under-...voltage protection, motor running protection and ...reversing starter.



Let Westinghouse help you modernize your motor and control the economical way. There is a Westinghouse electrical wholesaler, motor dealer, industrial agent or district office in all principal cities, ready to give you the benefit of Westinghouse research, engineering, and application. Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

J-90149

...lotors and Control

Steel Engineers Inspect New Coke Plant, Blast Furnace in Detroit

■ INSPECTION of the blast furnaces and coke plant of the Great Lakes Steel Corp., Detroit, was made April 19 by the Detroit section of the Association of Iron and Steel Engineers, in company with members of the association from other districts and members of the Eastern and Western States Blast Furnace and Coke Oven associations.

Technical details of these new plants were outlined at an evening meeting following the inspection trip. Raymond M. Hughes, assistant chief engineer, and William J. Rees, mechanical engineer, of Great Lakes Steel, presented a paper dealing with features of the blast furnace. Mr. Hughes stated that Great Lakes, previous to building this furnace, had on Zug Island, about 3 miles from the steel plant, two blast furnaces. Doubling of open-hearth capacity necessitated an additional supply of pig iron. The new furnace was placed between the two previously existing furnaces, and the placing of the various auxiliaries in the available space presented many interesting problems.

Necessity for additional storage space for ore, as well as for coal for the new coke plant, was met by providing a new storage space south of the coke plant, and installing a trestle along the side of this space, continuing it along the river front to the old high-line. Both ore and coke thus are transferred without interference with transportation at ground level. Ore transfer cars are electrically driven, while coke transfer cars are propelled by a fireless locomotive.

Ore Handling Facilities

Two new ore bridges were installed at the old ore yard and two other bridges were moved to the new yard.

Placing of the new furnace between the two older furnaces required rearrangement of gas cleaning equipment on the existing "B" furnace, while the installation of electrical precipitators for cleaning the blast furnace gas to the degree required for coke oven heating, also presented a problem.

Zug Island site is mostly blue clay, through which runs a 30-foot strata of sand. Hard pan is usually 72-80 feet below yard level. Accordingly, piling is necessary. The equipment which had been cleared away from the new furnace site had presented no extreme loads, and had consequently been built on piles driven only some 35 feet to the sand strata. These old piles were pulled by a cable sling and suitable hoisting rig.

Due to the highly concentrated loads for the new furnace and its auxiliaries, it was decided to use step-taper piles, from 70 to 77 feet long. These piles consist of 10-inch pipe lengths welded together to form the bottom of the pile, with a top section, similar to the conventional sheet-encased concrete pile. This upper part is usually 30-35 feet long and is joined to the steel pipe by a special locking ring. After the pile is driven and inspected, it is filled with concrete.

This type of pile has been tested to carry 100 tons, more than twice its loading in this instance, and has proved economical where loads are heavy and concentrated. Under the furnace proper, the concrete piles are on 36-inch centers in both directions, and are topped by a 15-foot concrete slab. A total of 1409 piles of this type was used for the furnace and its auxiliaries.

Furnace Lines

There is 15 feet of bottom brickwork under the furnace hearth. The furnace is lined to a 25-foot hearth diameter, a 28-foot bosh, and a 19-foot 6-inch top. The bosh angle is 81 degrees 28 minutes 9 seconds, the inwall batter, 0.962 inches. The large bell is 14 feet 6 inches in diameter, and has a 53-degree angle. The small bell has a 6-foot diameter. Total height is 102 feet 8 inches from hearth level to the top of the flange on the large bell hopper. Volume of the furnace is as follows:

	Cubic feet
Hearth section	5494
Bosh section	5521
Stack section	29,580
Stockline section	1344
Total	41,939

The furnace top is equipped with a revolving distributor which is electrically interlocked with skip and bell hoists. The large bell is operated through positive, rigid linkage. Skip and bell hoists, as well as furnace control panels, are located at cast house level, the hoist house being partially under the skip bridge.

The skip hoist is of the geared type, driven by two 150-horsepower, direct-current motors, each directly connected to two 150-kilowatt generators driven by a single 400-horsepower induction motor. The equipment is operated under age control.

Furnace Auxili

The stockhouse is co ore and stone bins, one two large central cok served by scale cars feet capacity.

Three hot blast stov diameter by 100 feet h heat the blast. They a small checkerbrick, for inch square flues, and tal of 191,000 square fe surface each. A cont temperature of 1500 de may be carried.

Each charge is comp 800 pounds ore, 3400 pou 2200 pounds flue dust, stone, and 17,100 pounds ing 69,900 pounds. T sequence is ore-ore-cok borings and flue dust-co

Essential details of t plant were reviewed by Betz, superintendent Hanna Furnace division. C. Vetter, engineer. Th that the plant consists of batteries, by-product benzol plant, coal and co systems and coal stora cated on Zug island, of shore of the Detroit rive nominal capacity of 3 coal per day, and prov been made for the futu tion of 20 additional o they be desired.

Coal Handling

Due to the advantage shipment, an unloading steel coal bin were From the bin, coal may b to the preparation syste storage yard. Facilitie provided to unload rail All handling is done ra efficient way by mode ery.

The coal preparation a capacity of 500 tons Two breakers reduce th size under 1½ inches, wh carried to four mixing shuttle conveyor. Mixer vey coal from the four st to the conveyor feeding mer-mills. where the co ther crushed so that 70 passes through a ⅛-inch s then carried to a storage three-hopper charging served from this bin.

Coke Ovens

The soil conditions of required the driving of ever any considerable load must be met. The pad, 3 feet thick, was la

(*Please turn to Page*

hey put us in with the LIONS

The shop foreman gave Shell his toughest job... as a tryout!

p-state New York, there's a plant ich has a shop foreman who oper- a pretty sensible principle when it to putting in a new oil.

gives the newcomer the toughest job plant and lets him *prove* whether he's or not. "Throwing 'em to the lions," ls it.

Shell man was no exception—and he med the chance to prove the worth ell Lubricants under the toughest tions.

s plant was working 18-8 chrome on their automatic machines—and g plenty of trouble with these tough s. The work was smoking, life of the was very short, and the finish in many was bad.

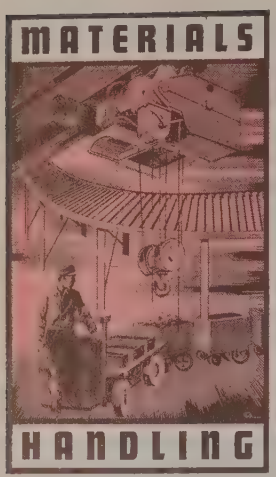
The Shell man went to work on these machines, conducting a series of experiments with the cutting oil. After he had completed his tests, he recommended to the foreman the correct type and grade of Shell Cutting Oil.

And the Shell man proved his product! No longer did the work smoke . . . finishes were smoother . . . yet the over-all cost of the Shell product was less than the oil formerly in use. To clinch the point, a check was kept on one nut-tapping machine, and it was found that production had been increased from 50 to 60 pieces per hour!

Have you a particularly tough, troublesome job in your shop? Shell would welcome the chance to show you how costs can be cut . . . production increased . . . with Shell Cutting Oils. These products are doing a great job in machine shops all over the country. Why not put them to work for you? There is a Shell office near you.

SHELL

HELL *Cutting* OILS



Preventing Scratches

By changing from manual to mechanical han dling of steel sheets, this manufacturer of foo display equipment succeeded in eliminatin practically all scratching and bending of sheet during unloading and storage

By **EARL W. KENT**
Works Manager
Tyler Fixture Corp., Niles, Mich.

■ SHEETS for porcelain enameling and synthetic enamel finishing must be handled without scratching or bending, if extra cost for refinishing and straightening is to be avoided. At plant No. 1 of Tyler Fixture Corp., Niles, Mich., it was found that most abrasions and bends in sheets occurred in connection with receiving and storing, during storage and when sheets were gathered for processing.

This plant is devoted exclusively to fabrication and finishing of metal parts and their assembly into all-steel refrigeration fixtures for food stores. Metal work for combination wood and steel units, which are assembled at plant No. 2, is also processed at plant No. 1. White porcelain enamel finish is used on interior surfaces exposed to foods, and porcelain or synthetic finish is employed on outside surfaces.

Because of frequent damage to sheets, management decided to handle steel sheets mchanically instead of by hand. Most of the scratches resulted from workmen walking on the sheets or from the sheets being dragged across one another as they were unloaded or stacked by hand. Mechanical handling in 1-ton lifts, instead of sheet by sheet, would prevent damage, it was thought, and would also effect definite economies.

Stock consists of Galvannealed sheets with heavy rust protection, hot rolled, pickled sheets eling stock. Sheets var and range in width fro inches and in length fro inches. Stock is receiv tor truck in 5-ton bundl in weatherproof paper. E is subdivided into five 1 steel-strapped to a woo as shown in Fig. 1. To p from the weather during receiving space is covered

Use Monorail Syst

Instead of unloading floor trucks a few sheets an electric hoist with sh grab and a monorail sy ing the entire storage fl handling a full 1-ton pac load. There are four para rail lines with switches across one end.

As steel is received, wrapped, straps are cut packs are lifted by the g grab has drop legs which carrying angle, welded t which slide in a main fr each channel is a steel tween the two racks is driven through a pair of s gears by a handwheel. A passes through a bearing the main frame. Knobbe the limit rod is set so as the bearing at a point d by the maximum desired and to prevent disengagem rack and pinions. This handle a variety of wi lengths of material.

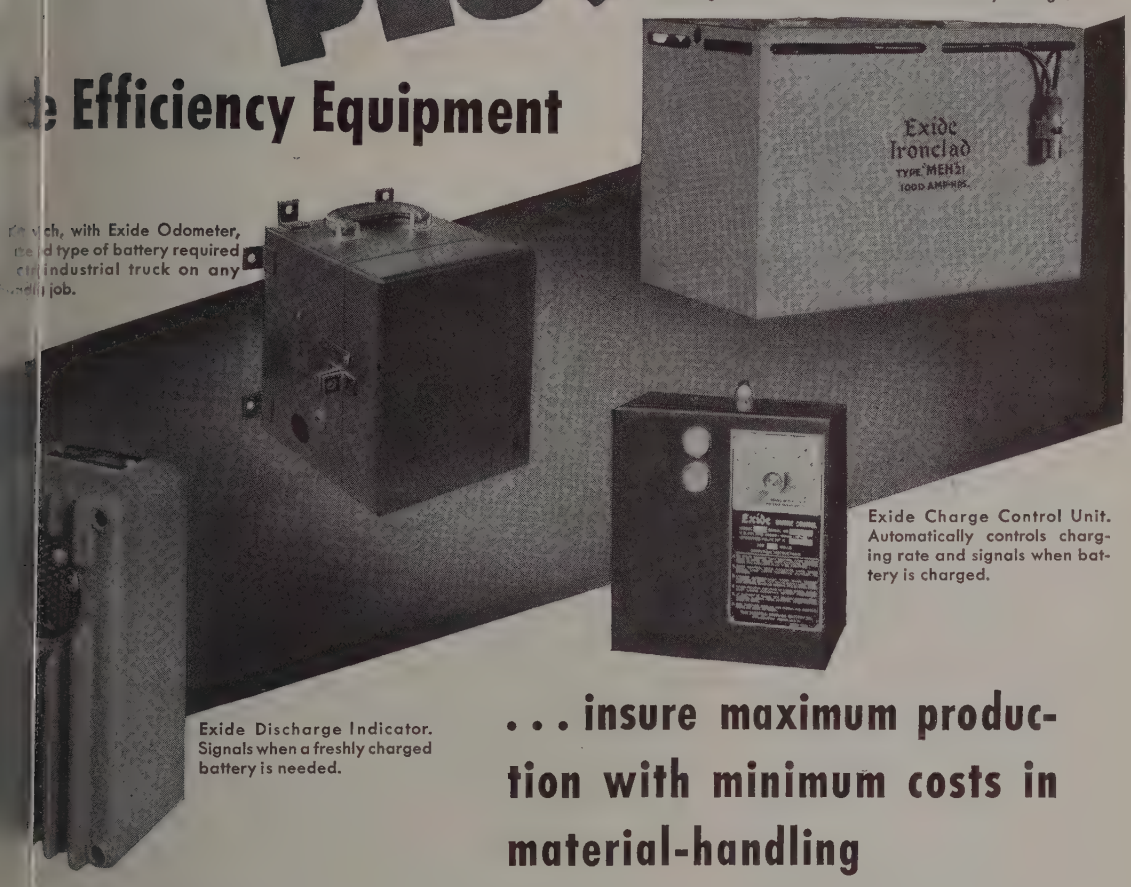
Although one man ca

(*Please turn to Page*

Fig. 1—Steel being unloaded hoist and special grab. Tr tends into covered unload which protects sheets from Photographs courtesy J-B E Sales Co., New Haven.

...e-Ironclads... PLUS ...e Efficiency Equipment

Exide's newest development, a 24-cell, 21-plate Exide-Ironclad Battery of the MEH type. More than 45 kilowatt hours available in a single unit! Designed to operate modern heavy duty trucks at full speed throughout an entire shift without battery change.



...ch, with Exide Odometer, ...d type of battery required ... industrial truck on any ...ell job.

Exide Charge Control Unit. Automatically controls charging rate and signals when battery is charged.

Exide Discharge Indicator. Signals when a freshly charged battery is needed.

. . . insure maximum production with minimum costs in material-handling

EXIDE keeps pace with—and anticipates—industry's ever-broadening needs. As greater production-demands brought better, bigger industrial trucks, capable of handling ten to fifteen-ton loads . . . Exide developed new, tremendously powerful Exide-Ironclads to operate them efficiently and economically. To the MVM and TLM Exide-Ironclads were added the oversize Types FLM and MEH, compact units of amazing power, with capacities of 700, 800, 900 and 1000 ampere-hours at the normal discharge rate.

But even good batteries require proper care. So Exide developed the Exide automatic Discharge Indicator, which gives visual warning when an Exide-Ironclad is approaching discharge. This contributes to better truck performance, and eliminates the possibility of schedule-destroying "tow-ins."

For still better service to Exide-Ironclad users, Exide developed the Exide Charge Control Unit, which *automatically* controls the charging rate of batteries, automatically cuts the circuit and signals when the charge is complete.

Exide also developed the Exide Odometer and Exide Test Kit, with which it is possible to determine what type and size of battery is needed to obtain the utmost efficiency from any electric industrial truck.

Let the Exide System solve your material-handling problems. Rugged, long-lasting Exide-Ironclads and these new auxiliary aids will enable you to move more material, move it faster, more efficiently, more economically. Write for full details.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

...xide
...NCLAD
...TTERIES
... MIPOR Separators
... Reg. U. S. Pat. Off.

Automo

Trouble-free valve performance is upon unusual care in manufacture ment, as shown in the accompany trations of operations in a Chevro

■ ILLUSTRATIVE of high-production valve manufacture is the technique employed at Chevrolet plant No. 5, Flint, Mich., where the entire valve requirements of Chevrolet—upward of 50,000 per day at times—are supplied.

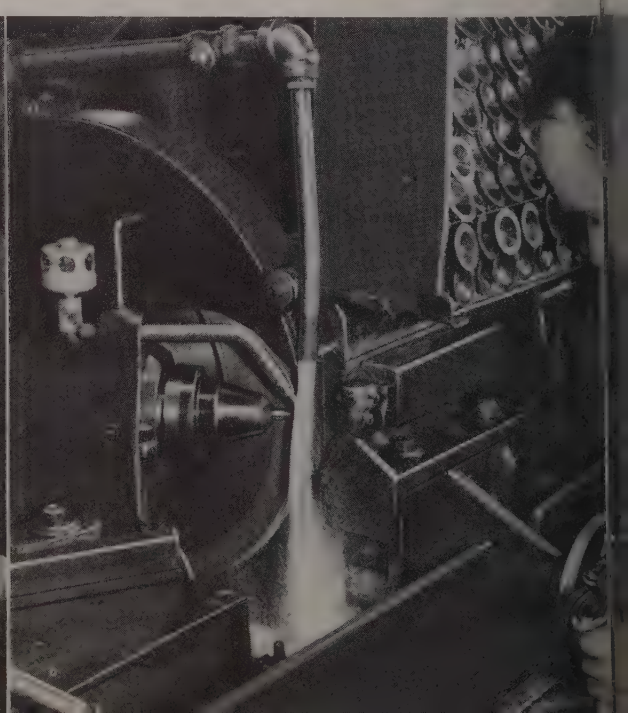
Fig. 6 tells the story. Pieces are: A slug sheared from bar, B slug after tumbling, C extruded valve, D extruded and coined valve, E roller straightened, F cut to length, G rough ground stem, H with semi-finish grind on stem, I valve seat ground, J end of stem ground, K end grooved and chamfered, L after finish grind on stem (completed valve).

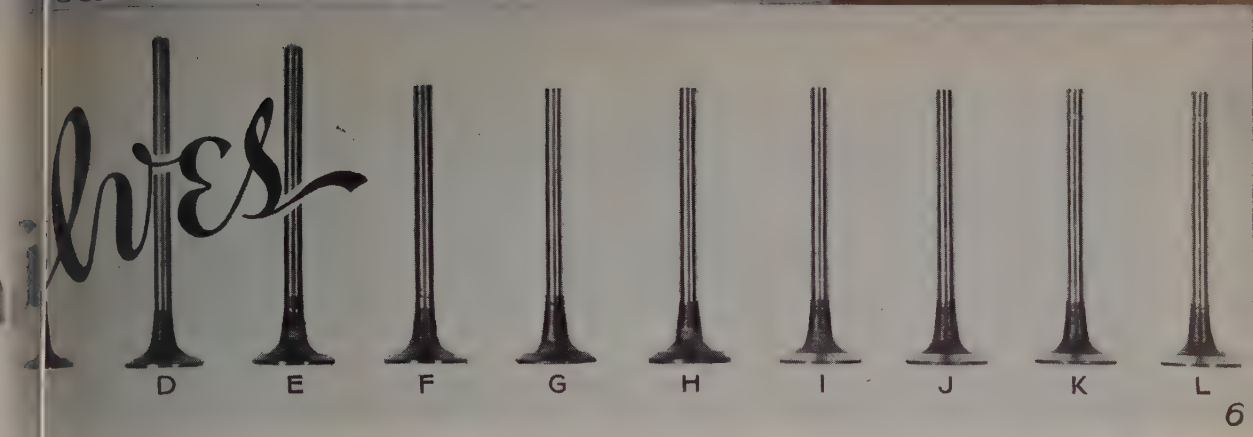
Sequence of operations is as follows: Both the inlet and exhaust valves are of a special type of silchrome steel, an analysis of the inlet valve showing a silicon content of 3.6 to 4.2 per cent with 1.85 to 2.50 per cent chromium, while the exhaust valve steel has a higher chromium content, from

Stock is received form, 1¼ inches by take, and 1⅛ inche exhaust valves. Ba 1350 degrees Fahr., and sheared, four slugs ⅞-inch long. cleaned thoroughly 3 hours, pass to an which heats them Fahr. in about 4 m tory to extrusion.

Extrudes

The valve shape p in 450-ton extrusion tery of 11 being oper having an individu nace. Each press ha for extruding the s for coining. The Fig. 2, is to extrude tic shape of the valv form the depression





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fer the piece from one
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of the steam is sheared
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in tote boxes over a
or to small tumbling
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stem is removed. Ex-
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to 1350 degrees Fahr.
at a moderate rate.

nt, the product is ready
g operations which are
rough and finish treat-
first step is to rough
ems, a battery of eight
inders being available.
is routed to a bench,
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elationship of head to
ecked and corrected if
A semifinish grind on
the next operation, a
ght centerless grinders,
ling this phase.

Next step is grinding of the seat face, a battery of 27 machines being available for this operation. Fig. 4 shows an automatic seat grinder. Next valves are washed with a steam spray and the seat inspected carefully, since all finish work from this point is located from the valve seat. Finishing of the stem is the next operation. First the stems are ground off to proper length in specially designed machines which hold the head down firmly and at the same time turn the stem. Turning the stem while being ground to length improves the finish on the end and insures stem squareness.

Ends of the valves then are chamfered and grooves cut, Fig. 5, in 8-station rotary machines, after which another battery of eight centerless grinders, Fig. 8, puts the finish grind on the stems. Before reaching these finish grinders, valves are transferred from the tote boxes to racks made of heavy steel frame and wire mesh which prevent scratching or nicking in further handling. Complete inspection of dimensions and finishes, Fig. 7, then follows, and the valves are ready for shipment.

7

8

Tubular Furniture

Where plating, polishing and assembly co tuted important problems and limited flexib in design, welding after these fabricating op tions had been completed resulted in a pro of excellent appearance that stands up we all types of service

By CLINTON BOLIN
Lloyd Manufacturing Co.
Menominee, Mich.

■ A RECENT design of chromium tubular furniture includes, as the main feature, the use of three streamlined ovals of tubing fastened tightly together to form the ends of a chair and davenport.

The problem of plating tubes tight against one another had previously been avoided because it was considered impractical due to the need of polishing and plating with the tubes fastened together as one unit. It is difficult to electroplate in the crevices where the tubes come together, and it is more costly to polish because an extra thin wheel must be used to get down between the tubes.

If the pieces were polished and plated as separate units and then fastened together, rivets or self tapping screws would have to be used, which was against the designer's wishes. He demanded that the chair end must be rigid and free from any projection of a rivet or screw head above the surface of the tubing. This was logical because this chair end acted also as the arm rest, and anything projecting above the surface of the tubes would catch in clothing or scratch a person's hands or arms.

It was decided then that the three ovals would have to be polished and plated as separate units and then fastened together. Rivets and self tapping screws were tried with their heads countersunk to keep them below the tube surface. Neither method was satisfactory. When chromium plated tubes are touching each other, they must be held absolutely rigid because any slight movement produces a most annoying squeak. To overcome this, the only method of fastening seemed to be welding, but this first appeared impractical because of the possibility of spoiling the plating around the weld.

At this point it was suggested that the tubes be arc welded together in spots in the crevices on the underside of the tubes. A few pieces of plated tubing were secured and experiments begun. Soon it was found that by using 60 volts, 60 amperes and a 3 eter rod, an excellen be made, free from plating around the good as ever.

A chair then was r arc welded after all plated. The welding spots approximately a the underside crevice tubes came together a painted with alumino keep them from rustin end was extremely ri welds were completely ordinary view. The upl of the chair, that is back, were suspended which in turn were fas chair ends. Self tapping used here together with weld because of the ext the fastening point. A would be too noticeab tapping screws were to here because they we way and could not catch

Construction Is

The completed chair is Fig. 1, a truly modern lined a piece of furnitu welding made possible th design.

This suite, however, w the higher priced bracke fore was out of the re mass market. So the sa of this design were inco a medium priced desi which sold for the formerly charged for more conventional furni the 2-tube idea was used effect. On one particula

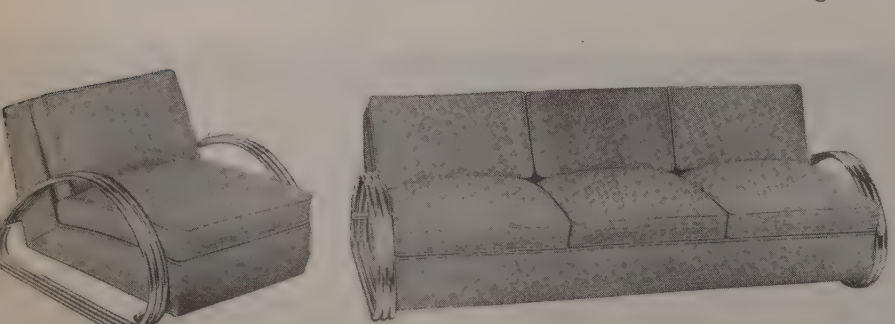
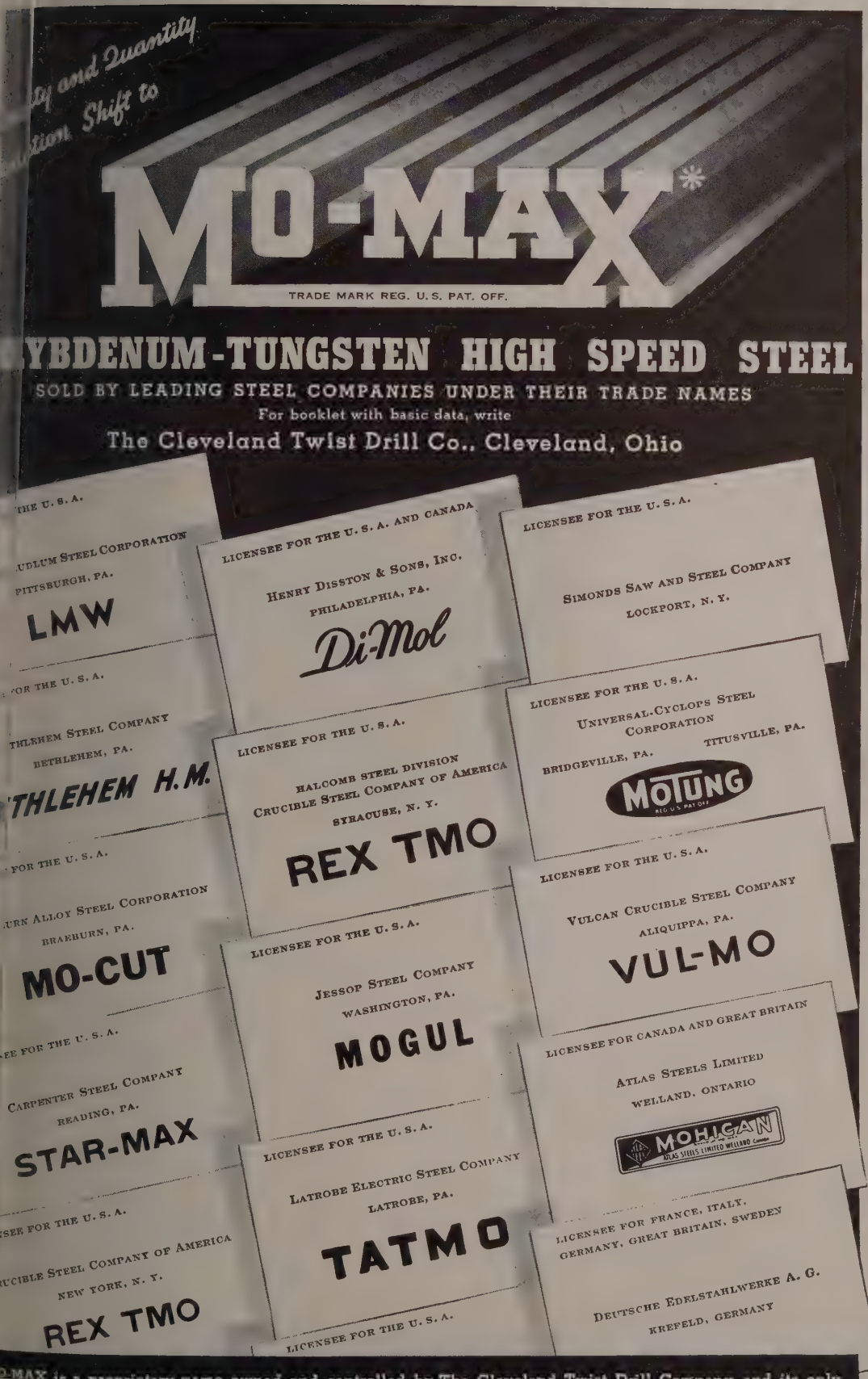


Fig. 1—Wrap around tube is used for chair and dav here. Joints are made un running a weld across ad faces

This is abstract from paper receiving third main award, $1,729.84, in Furniture and Fixtures classification of the $200,000 Award Program sponsored by James F. Lincoln Arc Welding Foundation, Cleveland.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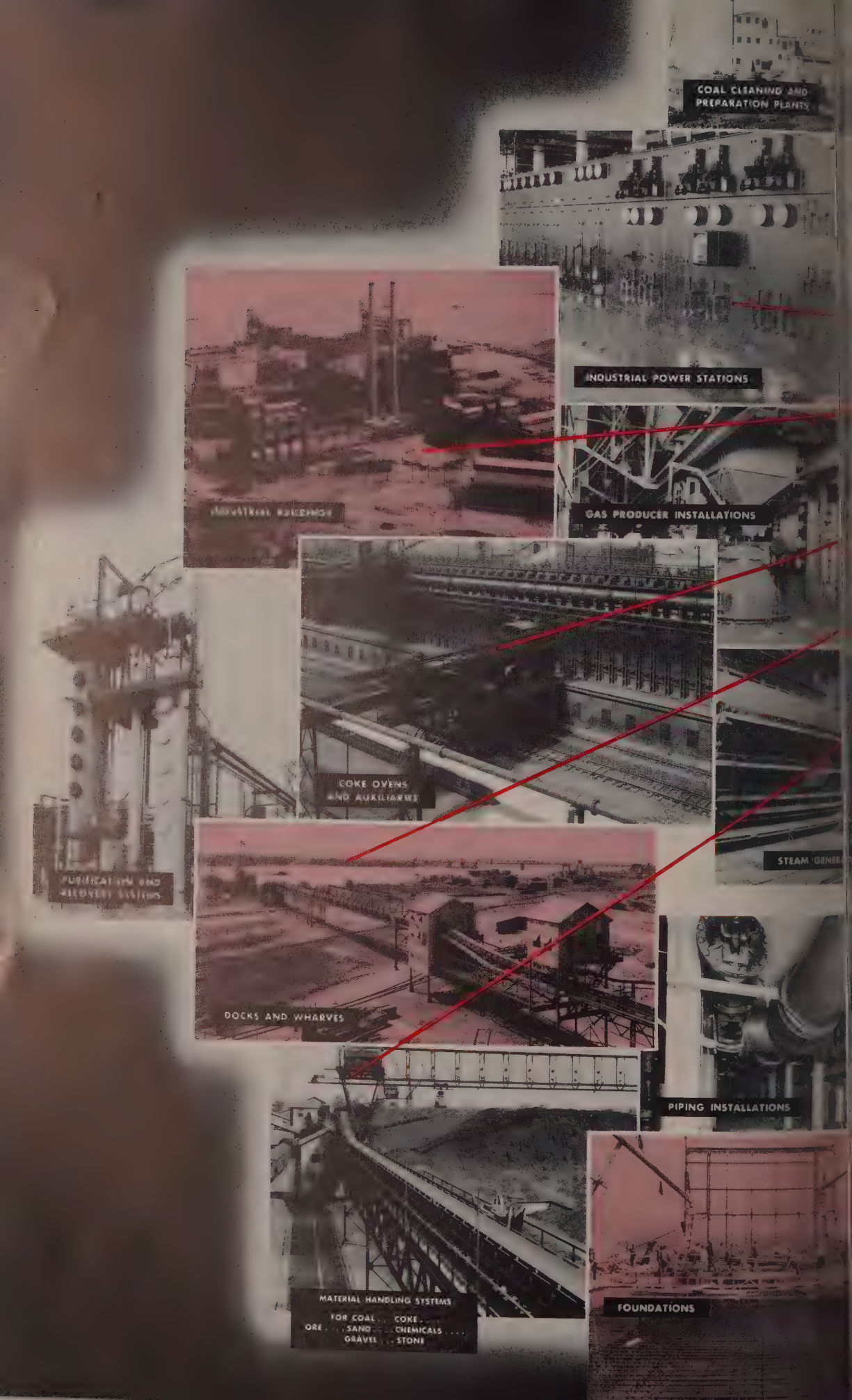
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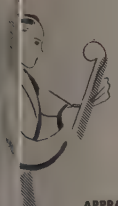

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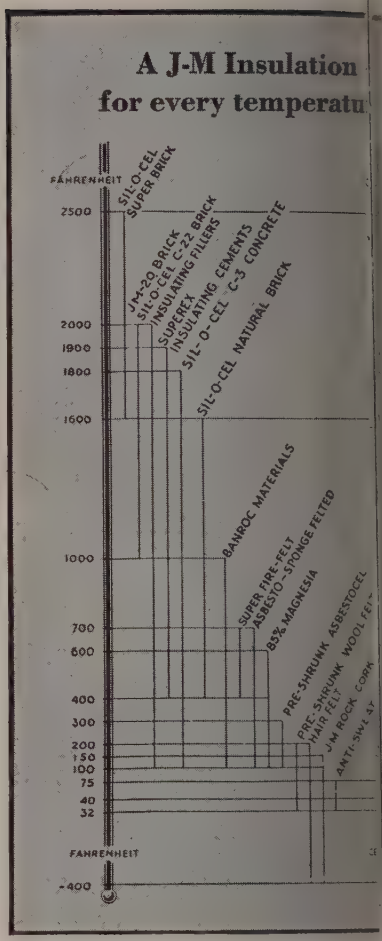

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iced line using coil of
pieces center and at
left uses two tubes
at sides, one tube ex-
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double tube chair
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After Polishing

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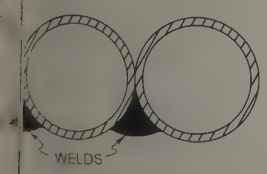


s section through tubes
es shown in Fig. 1 with
ss under side of tubes

economy in the long life of this furniture.

This method of arc welding after plating can be used throughout the chromium furniture industry to eliminate rivets and screws in places where the weld isn't noticeable. It permits a more rigid and smoother design. It is expected to broaden the field for designers who heretofore have been limited because of plating, polishing and assembly problems.

Inspect Blast Furnace

(*Concluded from Page* 52)

of 6000 wooden piles 75 to 80 feet long and driven down to hard pan. Five longitudinal concrete walls support transverse beams, on top of which was laid the oven pad.

The ovens are 15½ inches wide on the pusher side and 18½ inches wide on the coke side. They are 42 feet 9½ inches long by 13 feet 5½ inches high, and take an 18-ton coal charge. Either coke oven gas or blast furnace gas may be used for underfiring, and the layout is such that any group of ovens may burn one fuel while the balance use the other fuel. Provisions have also been made for diluting the coke oven fuel gas with blast furnace gas, to a calorific value of 450 B.t.u. per cubic feet. Likewise, blast furnace gas may be enriched if desired.

Reversing machines, decarbonizing machines, control of fuel gas, and all oven instruments are located in a room between the two batteries. Continuous recording calorimeters show the heating values of both blast furnace and coke oven gases.

The ovens are provided with self-sealing doors. There are two pushers, but either machine can handle both batteries in case of an emergency. Quenching cars are moved by 20-ton electric locomotives. The quenching car, coke guide, and pusher machine are electrically interlocked so that all machines must be located at the proper oven before the pusher ram can be operated.

A quenching station is located at each end of the quenching track, and is formed of a structural steel framework with corrugated transite siding. They use waste water from liquid coolers in by-product plant.

From the wharf coke is conveyed by belt to the coke screening station, which has a capacity of 175 tons per hour and is arranged to produce foundry, furnace, and domestic coke. The screening station is flexible in arrangement. All conveyors are electrically interlocked so that a stoppage of any one shuts down all units.

Industrial Lighting

■ Advances in the art of lighting have made possible a scientific approach of lighting for industrial machines used in the manufacture of small metal parts. Results of studies by the Illuminating Engineering Society, through its committee on lighting practice, dealing with this subject have been published in a pamphlet "Lighting for the Machining of Small Metal Parts." Lighting of plane and convex surfaces such as on flat rules, calipers and indicating scales of machine tools is analyzed.

The experimental results reported indicate the desirability of diffusing light sources of comparatively low brightness which subtend a large angle at the point of work. This may be either a source of small physical size close to the work or a large source subtending the same angle at a greater distance from the work.

Indirect lighting today provides most common large area diffusing source. Where it is impractical to use the ceiling as a diffusing source, smaller diffusing sources mounted relatively close to the work may be used. No specific spectral quality of light is recommended for maximum visibility. Copies of the pamphlet may be obtained from Illuminating Engineering Society, 51 Madison avenue, New York.

High-Speed Press

New system of oscillating die movement an press action eliminates dwell and sudden reve sal of driving forces, producing smoother oper tion, longer die life, and previously unheard-o working speeds. Quality improved by spee

By JOHN MITCHELL
President
Super Speed Press Corp.
New York

■ THE RECENT trend toward increased use of parts build-up from punched steel laminations may be augmented greatly by adoption of a new type of high-speed punch press recently developed.

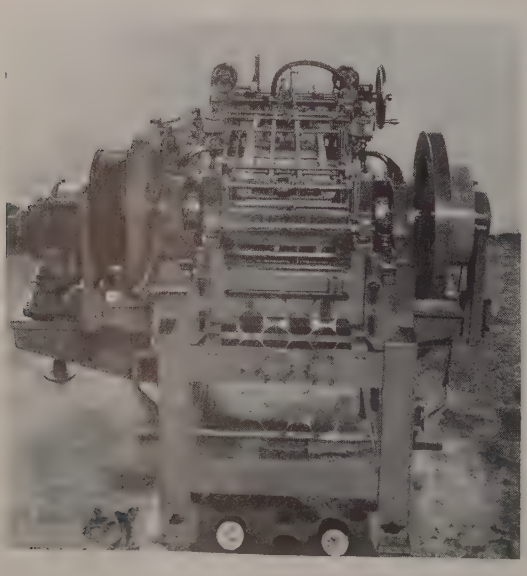
When solid parts of electrical equipment such as motor rotor cores and field cores are made of thin laminated sheets stamped out and assembled by stacking to get the required thickness, it is extremely important that the laminations be free from burrs and exactly to gage. Also the building up of solid parts from stamped laminations holds interesting possibilities in other than the electrical field as some very practical results in reducing cost of articles have been obtained by adoption of this method. Intricate shapes can be punched out accurately so that when assembled by riveting or brazing to make a solid piece, no further machining or finishing is necessary.

Designers of press equipment have contributed much toward speeding up and increasing the accuracy of the manufacture of stamped metal parts. One design of particular interest is shown in the accompanying illustration. This particular setup is used to blank out sheet metal container tops from wide coil strips. In this type of press, the die bed reciprocates in a horizontal plane, the amount of its travel being approximately 1/3 the feed per piece. The punch member takes its motion directly from a crankshaft, the amount of stroke being adjustable. The resulting rotary motion of the punch face coincides at its lower arc with the reciprocating die on stroke.

In going through t stock travels continu gripped by the stripp between the punch and whole thing travels f zontally as the punch p sheets. As it passes t the stroke, the punc from the sheets and clears the punch. Sto to be fed forward by trolled directly from th through a variable Since this can be adjus machine is running, it to synchronize the mo various members to minimum amount of s the accompanying illus a mere skeleton of t mains after the work punched out.

When the stripper is with the work and w and forming are being operated feed roll lifte to release the feed roll tion is continuous, ther time in recovery and dwell either of stock or the machine takes stand and avoids the necessit dies, dies from 1 to 10 used in the press. The work produced is said much superior characte son for this is given by holes made in a pane Throwing a piece of me a glass at low speed ragged hole. At high spe cut hole is made. This a the extremely good resul on this press.

Obviously, this press speed machine. Its top sp strokes per minute ind high production possibilit equipment. Production course, will vary with t



Super-speed press blanking out sheet metal container tops from a coil of steel strip

size and thickness of
haracter of the die.

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Quality Is High

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most important results
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y, with the same over-
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in both these figures
sale—$139. With this item
he cost of manufactur-
3 and $22 respectively.
just two hours work
er-speed press. While
will vary with the char-
rk, the percentage of
e quite similar to that
example.

ine is not merely an
over old methods, but
it as an entirely new
much more simple and
of producing superior
rk at lower cost.

actor reducing die cost
that extremely small
amount of heat is produced in the punch and die. In the super-speed press, virtually no heat can be detected.

The machine is already being employed on steel thickness varying from 0.002 inches to 0.095 inches. Three presses are in use producing radiator fins at high speed. Electric motor laminations and transformer parts are being produced on other machines with no burrs or ridges around the edges of the laminations. On one job, a super-speed press operates at 1700 strokes per minute which possibly is the highest yet obtained by these machines. However, this is believed not to be the maximum possible speed that may eventually be attained.

Work Limits Speed

Of course, on many operations the type of work involved limits the speed of the press to 1000 strokes per minute or less. Nevertheless, it has been found possible to increase greatly the number of strokes per minute thought possible on various types of work by designing the dies with a little more clearance than usual. Even when greater clearance is given, the edges are still sharply cut because of the extreme speed of operation of the machine.

In more than one instance it has been found that dies regarded as too badly worn for further use on ordinary type of presses, when installed and set up on the super-speed press were found to operate perfectly, due to the greatly increased speed.

Another cost factor which permits a further saving is that the high speed of production provides an opportunity of using one die, one up. This may be an important saving in die construction as it may eliminate entirely the original cost of making a die more than one up. Yet the increased production desired is still available due to the high speed of the press.

At the same time, dies from 1 to 10 up can be used in the super-speed press if desired, and progressive stamping and forming operations also can be handled at the same high speed as ordinary blanking operations.

Rigid Frame Tests

■ "Strength of a Riveted Steel Rigid Frame Having Straight Flanges" is the title of a pamphlet published by the national bureau of standards. The distribution of stress in a riveted steel specimen was determined theoretically and experimentally, and the maximum load measured. Photographs, tables and charts illustrate results. Pamphlet may be obtained as Research Paper RP1130 from Superintendent of Documents, Washington; price is 15 cents.

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■ Westinghouse Electric & Mfg. Co. has conferred its Order of Merit, a medal and citation for outstanding contributions on 24 employes, raising the total number to 85 since the order's inception in 1935.

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Dr. Emerson B. Roberts, assistant to the vice president, industrial relations; S. R. Shave, director of the budget division, accounting department; Ira B. Stiefel, manager of industrial relations, and D. I. Vinogradoff, manager of foreign engineering, all of East Pittsburgh.

John T. Burke, supervisor of industrial relations; Oscar A. Frejd, master mechanic; John K. Hodnette, transformer development engineer; and Henry J. Wilcoz, all of the Sharon, Pa., transformer plant.

W. C. Hipple, superintendent, Trenton Lamp division, Trenton, N. J.

Cornelius J. O'Brien, manager, traffic department, Westinghouse Electric International Co., and Charles A. Reinwald, assistant secretary and attorney, law department, both of New York.

William A. Stacey, manager, western district, Bryant Electric Co., Chicago.

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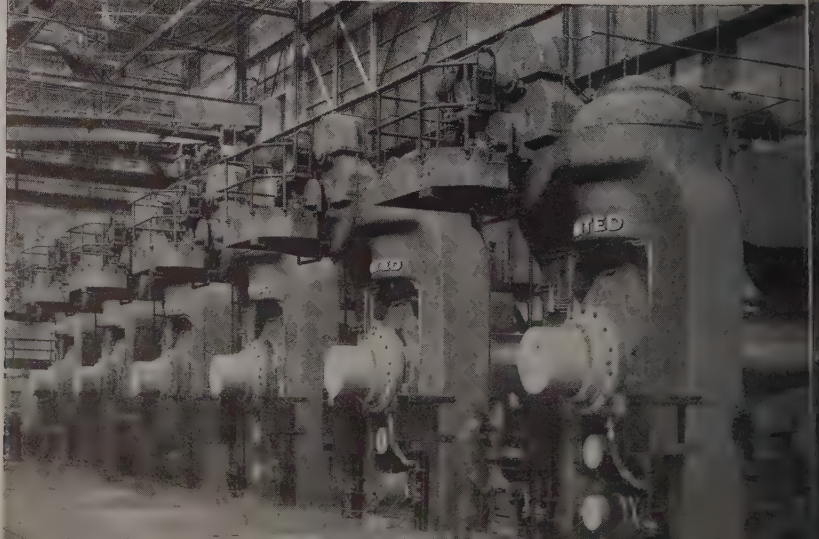
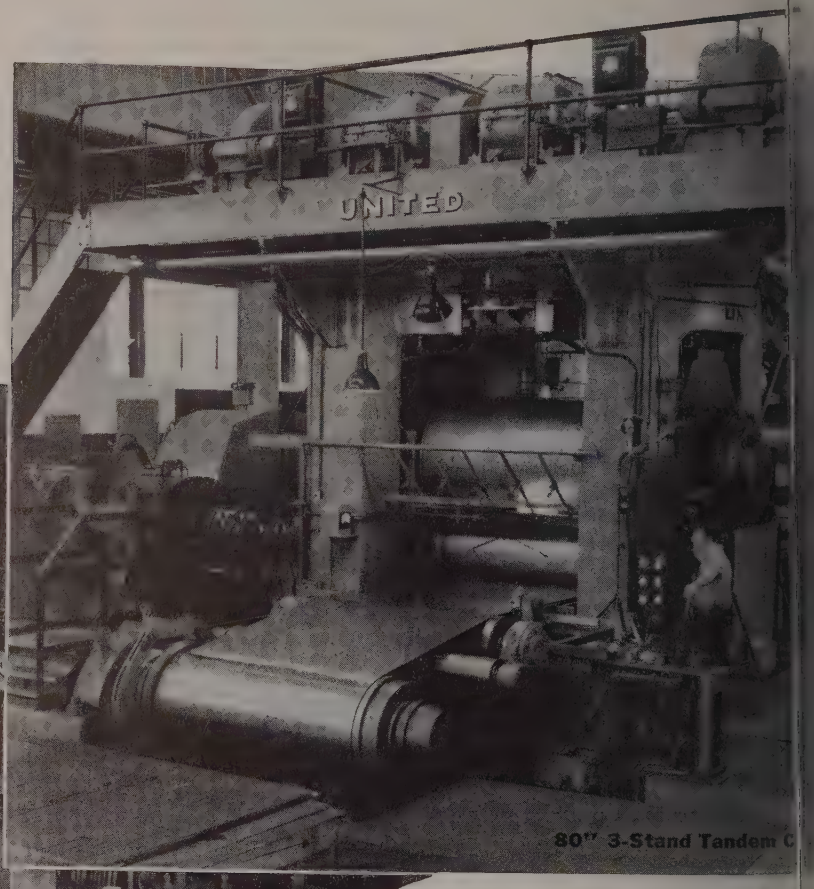
Complete rolling

4-Stand Tandem Tin Plate Mill



98" Continuous Hot Strip Mill

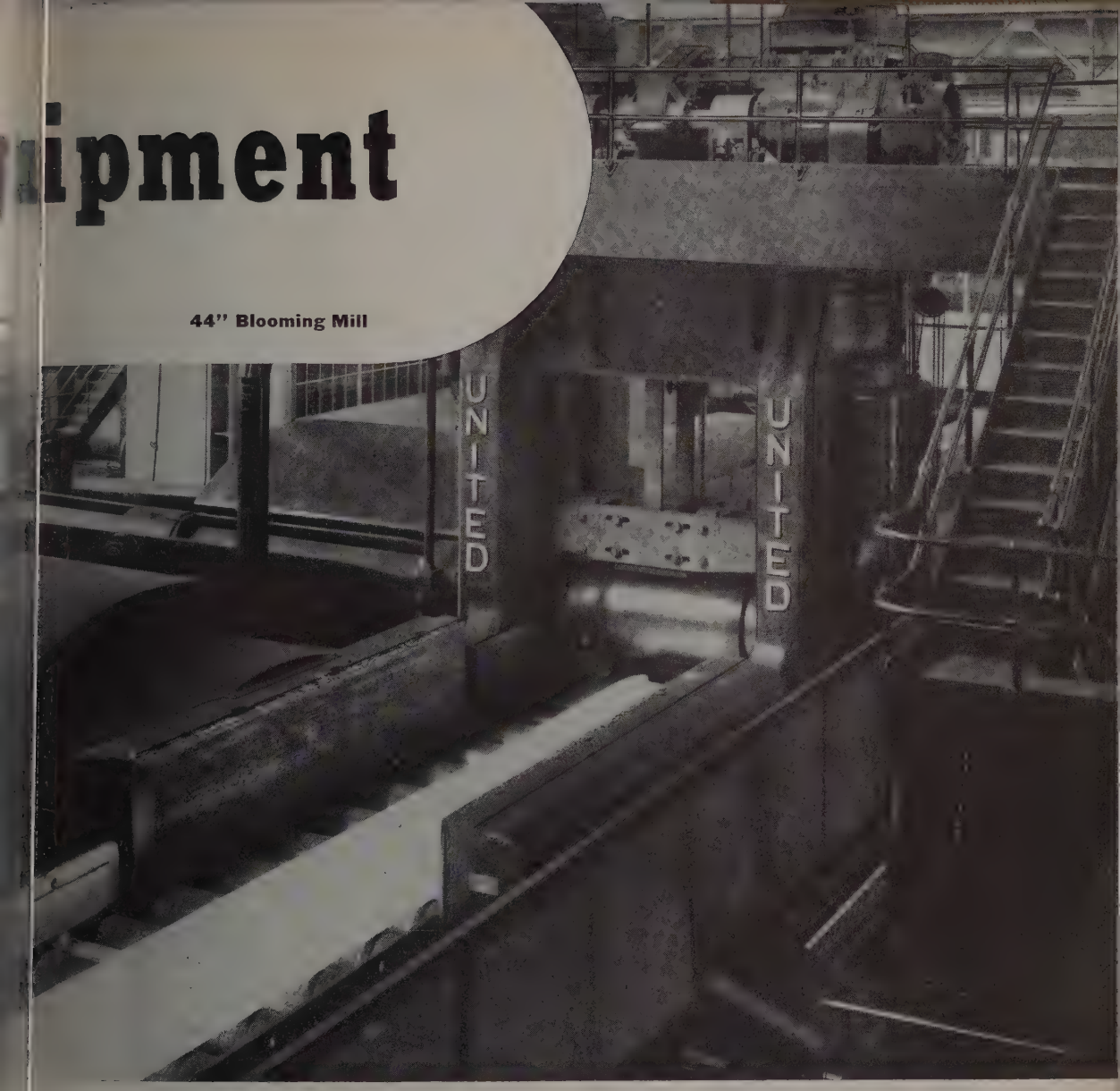


80" 3-Stand Tandem C

UNIT

ipment

44" Blooming Mill



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PITTSBURGH · PENNSYLVANIA

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12" 7-Stand Merchant Mill

Cold Finished Bars

In order to produce heat-treated cold finish bars for automatic screw machining this co pany installed the furnace described here. U of such preheated bars effects considerab economy where hardness and physical requi ments are suitable

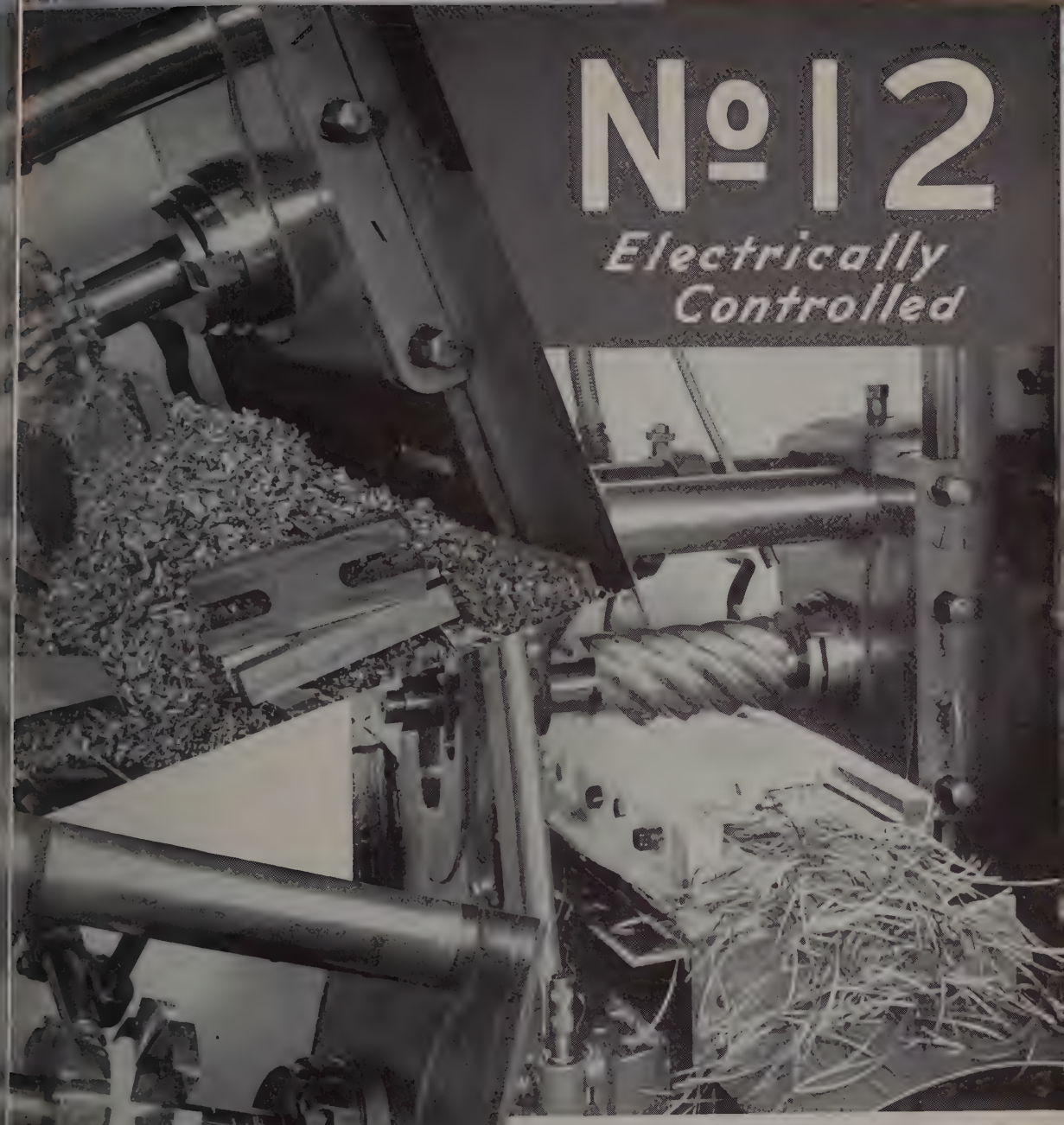
By A. G. STUR
Metallurg
Wyckoff Drawn St
Chicag

■ CONFRONTED by a mand for annealed and cold finished bars, pa alloy steels of 0.35 to 0 carbon range such as SA 4150 and 3250, and als steels such as SAE 1045 Wyckoff Drawn Steel C recently installed a car furnace in its plant for normalizing, heating for drawing and stress re

This furnace, shown in a car bottom 36 feet lon wide and a rated annea of 40,000 pounds per ch tance from top of piers to spring line of the inches (Fig. 2). Fifty l mixed gas burners in sidewalls fire both ove the work. This multiple ers assures uniform he low temperature operat as drawing and stress re oven, firing burners alo used.

Flues are taken out nace chamber at hea through vertical flues in walls. Vertical flues te horizontal collector flues in the horizontal collecto three alloy dampers, op means of a motor mechan

Fig. 1—View of furnace sh equipped with alloy stools. ment was designed, fabricat stalled by Surface Combust Toledo, O.



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B·S Brown & Sharpe Mfg. Co., Providence, R. I., U. S. A.

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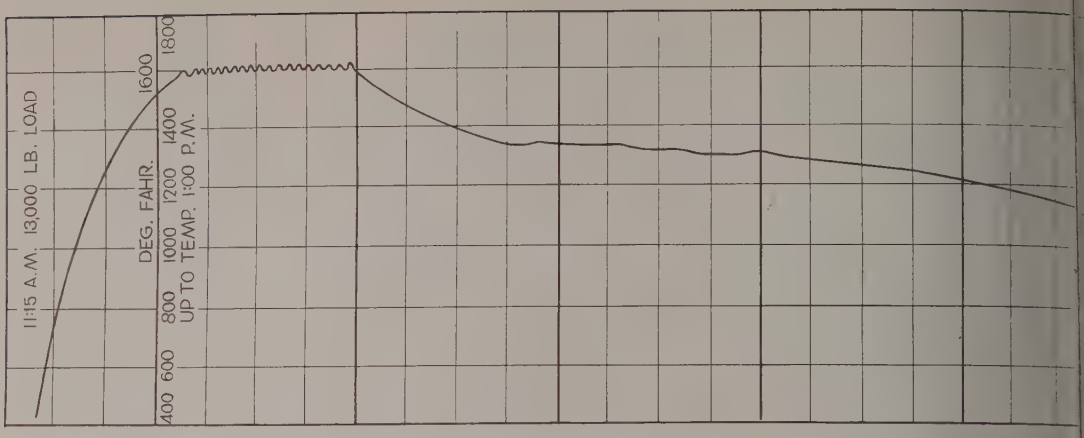


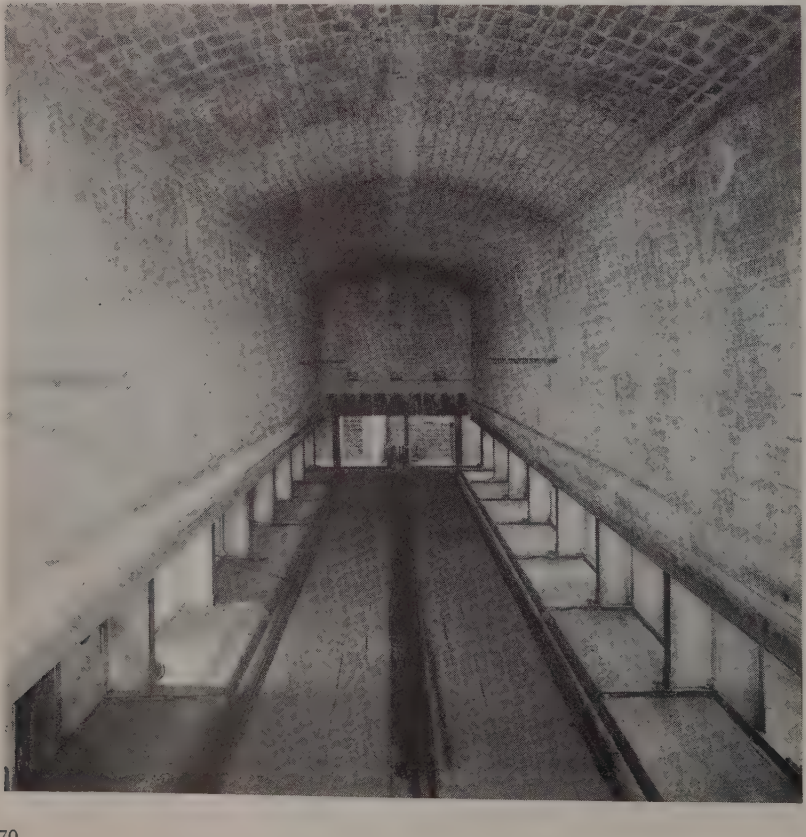
Fig. 3—Time-temperature ... heating and cool...

in turn, operates in conjunction with the heat control. When burners are operating, the dampers remain open. When heat control shuts off the burners, motor mechanism automatically closes the dampers, thus keeping a pressure in the furnace and preventing air filtration.

Furnace sidewalls are lined with 9 inches of insulating fire brick backed up with 4½ inches of plain fire brick. The arch, back wall and door also are lined with 9 inches of insulating fire brick. With a 40,000 load, the furnace and load can be heated to 1600 degrees Fahr., from cold in 3 to 3½ hours.

It has been found that for most machining operations on annealed and cold drawn alloy steel bars, a structure consisting of lamellar pearlite with ferrite well distributed produces the best results. To produce this optimum structure, a definite rate of cooling through the critical range is required for each particular type of steel. This is where insulated furnace walls are an aid. Owing to low heat storage, furnace starts to cool when the gas is shut off, and as the cooling rate is very fast, a controlled cooling rate is maintained easily by manual operation of several burners. Fig. 3 shows a time-temperat... annealing a 13,000-poun... for heating to temper... hour and 45 minutes. ... stance, cooling rate thr... ical range was about 3... hour.

Fig. 2—Interior view of furnace. Note burners in sidewalls. Burners fire both below and above the work



Demand for heat-trea... ished bars necessitated ... tion of mechanism for ... ed bars from the ... quenching them in oi... This individual quenc... for uniformity. Afte... quenched, they are pl... furnace again and are ... proper temperature to ... desired properties. Th... and tempered bars then ... drawn or straightened ... or grinding.

The usual limit of ... such pre-heated bars ... brinell, although it is ... furnish bars to highe... Where hardness or oth... requirements are such ... treated bar can be use... often a considerable s... use.

The heat-treated bar c... chined as readily as an a... but against this increas... ing cost is balanced the ... of further operations su... treating the part after ... the cleaning usually re... heat treatment and co... changes in dimensions ... distortion in heat treatr...

Addition of lead to ste... its machinability in the ... ed condition, making p... increased use of pre-... bars. Where close tol... required on heat-treated ... prehardened bars are ... hardness requirements ... yond the machinable r... provements in tools and ... together with improveme... chining qualities of ste... tend this machining ran...

...ce Hardening Processes Are ...ewed by Ohio A.S.M. Chapters

...TING their annual tri... ...leting at the Alms hotel, ... April 20, the Cincinnati, ...and Dayton chapters of ...can Society for Metals ...is year's technical pro... ...and "Unusual Surface ... processes. Three papers ...tention to flame harden... ...facing and silicon impreg... ...pectively.

... with flame hardening, ...mith, Air Reduction Sales ... York, emphasized advan... ...his process as: Ability to ...rden work in the finished ... minimize distortion; ease ...ing results; applicability ...oo large to handle in a ... work involving only a ...s, or to volume produc... ...ll; and economy because ...nent is simple. Castings ... products can be locally ...ardened after usual heat ... to obtain desired physi... ...ties.

...els that can be hardened ...ry methods can be flame ... the speaker explained, ... steels having a 0.40-0.60 ... carbon content are best ... the process. Fine-grained ...arden particularly well, ...ined must be heated with ...void burning. Possibilities ... iron and malleable iron ...although alloying elements ...plicating influences.

...rburizing by Flame

... carburizing and hardening ... newest development, Mr. ...mmented. In this work, ...of carburizing type is em... Two flames are used, the ... heating the work to car... temperature and the sec... ...orming the carburizing. The ...t is followed by a quench.

...ons arising from the speak... ...entation dealt largely with ...ons and technique. Ex... the hardening of teeth on ...one gears, Mr. Smith stated ... torch does not make turns, ...kes two passes for each ...ch from the outside in to ...r. Although this procedure ... an area in the tooth junc... ...ich is somewhat less hard ... remaining portions of the ...es of the tooth, this has not ...detrimental.

... areas are hardened by mak... ...essive passes with the torch ...e entire surface is treated. ...dexing is adjusted to give ...um of overlap, otherwise a hardened area will be rehardened. This is not desirable because of the danger of surface checking. Alloy steels, particularly the air hardening type, can be hardened without quenching after application of the flame. In cases where checking is a factor, an air blast is used, Mr. Smith said.

"Hard Facing Alloys and Their Application" were discussed by R. L. Lerch, Haynes Stellite Co., Kokomo, Ind. Corrosion, erosion and abrasion are the chief enemies of metals, he asserted, and hard facing is particularly suitable for combatting abrasion and corrosion, or a combination of the two. Unfortunately, no satisfactory means has been devised to determine whether a material will or will not stand up in service—only experience with the materials in actual application will provide the answer.

Hard Facings Classified

Classification of materials offering resistance to abrasion was made as follows:

1. High carbon steel with alloying elements, also cast iron. For uses which are not severe.

2. Higher iron base alloy group with up to 20 per cent alloy. Will withstand more severe abrasion.

3. Iron base material with 20-50 per cent alloys.

4. Nonferrous materials, principally cobalt, chromium and tungsten.

5. Tungsten carbide (cast). This is placed in a hollow tube and applied to surfaces by welding.

Ferrous hard facing alloys can be applied either by electric or oxy-acetylene welding processes, nonferrous alloys are best applied by oxy-acetylene, Mr. Lerch stated. Advantage of hard facing is that it permits use of an inexpensive base material with only the wearing areas of hard relatively expensive material. Preheating to obtain even expansion of the surface is desirable before applying hard facing. Heat treating afterward usually is not necessary, slow cooling equalizing strains. In special cases—those requiring impact resistance in the surfaced part— special heat treating is performed.

Some parts, the speaker continued, need to be finished. This is sometimes done by machining, but more often by grinding. As wear in the faced surface occurs, hard facing can be reapplied, but usually this is simple and needs be done only at certain spots or areas. Base material to be hard faced should not be too soft, else it will not support the facing. Best carbon content of base material is 0.40-0.50 per cent, above that, parts may be brittle and break, although proper heat treating may remedy this.

Manganese steel is difficult to hard face, Mr. Lerch explained. Best results are obtained by using the electric arc and applying as little heat as possible. High speed steel also is a tricky base material and is naturally high in cost, unless the application demands its use. It has a tendency to crack when hard faced.

Silicon impregnation as a means of treating ferrous metal surfaces to obtain corrosion resistance and some degree of wear resistance was explained by Dr. Harry K. Ihrig, director of laboratories, Globe Steel Tubes Co., Milwaukee. As a preface, the speaker explained that corrosion is a chemical disintegration of a surface while wear is the pulling out of particles from the surface. Since corrosion is of chemical nature, we depend upon film formations on metal to prevent corrosion. Even stainless steel is protected by a film, Dr. Ihrig pointing out that this metal will corrode when this film is removed.

One of the best films would be an oxide which is inert, he continued, and such a film is silicon oxide, SiO_2. In proof of this, he stated that high silicon irons are highly corrosion resistant. Through extensive investigational work, Dr. Ihrig conceived the idea to put a film of this type on iron and steel, and in consequence developed a process which is known as Ihrigizing.

Silicon Impregnates Surface

In the presence of chlorine, silicon carbide (SiC), an inexpensive granular material produced in the electric furnace, will release its silicon at a temperature of 1800 degrees Fahr. and this silicon will impregnate ferrous material with which it comes in contact. The process is carried out in a rotary retort furnace turning at 1 revolution per minute, the silicon carbide being placed in the bottom of the retort. Work is placed in the chamber and brought up to 1800 degrees. When this temperature is attained, a stream of chlorine is introduced into the furnace. A case ranging from 0.025 to 0.040-inch is obtained in from 2 to 3 hours. Cooling is in air. The case contains approximately 14 per cent silicon and will not scale at temperatures up to 1800 degrees Fahr. Cases can be produced ranging in thickness from 0.010 to 0.100-inch.

Wear always is aggravated un-

(*Please turn to Page* 78)

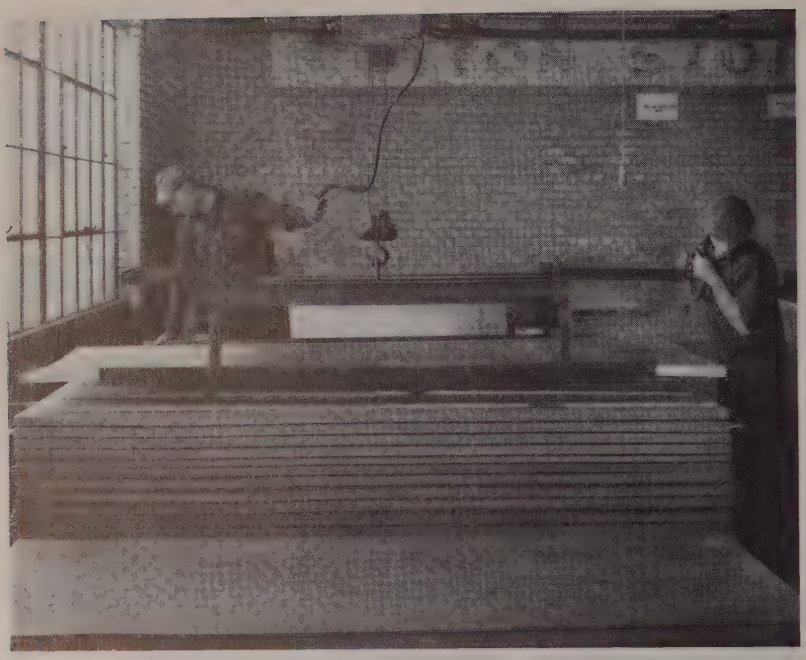


Fig. 2—As sheets are stacked in storage, one operator controls hoisting movements while another guides the grab by means of the handwheel located at one end

(*Concluded from Page* 54)

the hoist and grab, two men are assigned to the job to speed up the operation. Two men can guide the grab more easily over the pile and fit the carrying angles to three openings between the 1-ton packs. A free-swinging grab might easily hit and bend edges of the sheets. Such damaged edges caused most of the scratches which occurred in rehandling at the press.

The 2-ton electric hoist is floor operated with power lift and travel. Packs of sheets are transported to storage space and are piled up to 5 feet high with 1-inch wood separators between packs for ease in rehandling when issued to production. Before new stock is deposited, all sheets remaining in the pile are set aside, then placed on top the new pile, thus assuring that old stock always is used first. This practice prevents loss from rusting. Continuous inventory is kept at the factory office for ready reference.

When steel is stored, piles are set up in pairs with approximately 6 inches between each pair to permit access by the grab, Fig. 2. Packs are set with the long dimension crosswise the track, which permits serving more piles and a greater floor area from each monorail. Thus all stacks are accessible without climbing or walking over the sheets.

All sheets involved in regular production are handled mechanically in 1-ton packs and are placed in open floor storage. Mechanical handling has eliminated practically all scratches, bends and turned edges, with a corresponding saving in finishing time and expense. Sheets used infrequently and special stock are kept in small quantities and are stored in racks by hand. As comparatively little of such manual handling is required, men can observe more care in their work and avoid damage to these special sheets.

One monorail line extends back into the press shop so that presses using large quantities of steel are supplied directly from this line by the hoist. Smaller quantities issued, or stock for presses not served by the monorail, are placed on a four-wheeled truck by the lifter, or in small quantities by hand, for transfer to presses. Extreme care is observed at presses to prevent scratches in processing.

One of the more popular models of food display cabinets made at this plant is manufactured in lengths of 4, 6, 8, 10 or 12 feet. This means that some parts are quite long. Press work is in quantity production, and many parts are assembled by welding.

Shear Fed from Storage Racks

■ EXTRA handling of long, light, tubular stock for bedsteads is eliminated at the plant of Harter Corp., Sturgis, Mich., by an arrangement in which stock is fed directly from storage rack to the cutoff press.

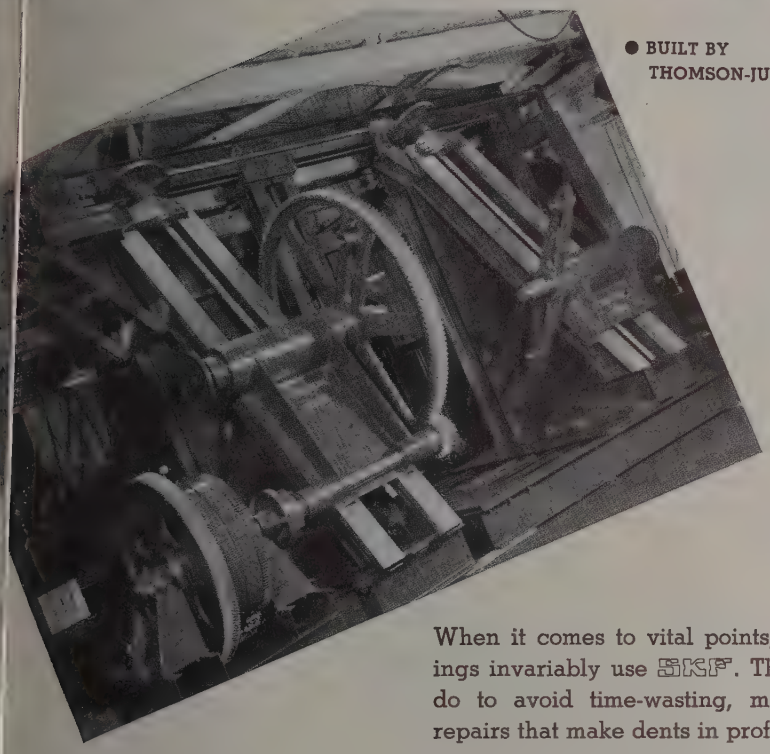
As stock is received at the plant, it is stored flat in partu located just inside th door. Cross sections ar heavy demand are stor level. Stock is fed dir the rack into an inclin press which is mounted and is movable on a trac across front of the rack easily lined up with the s manner. Cutoff shear die with a special clam which holds tubing ar crushing when shearing Lengths as sheared are truck for transportation ary storage or directly tion or processing line.

When stock in the ra a level below the cutoff press bed, tubes are plac extending out from u tween the racks. This straight feed to the pre tomatic indicator counts they are cut off.

In addition to elimin rehandling of long stock ering possibility of bend age, this arrangement space. If tubes were rer rack to a separate statio press, considerable addi space would be required ary storage of tubes at A similar plan may be u dle strip, bar and structu

This cutoff press is arran fed directly from racks wh is stored. Note wheels which facilitate lining up the stock

AL PERFORMANCE



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What SKF Bearings are doing on this 130" Take-Up Reel Stand is a good example. They give a smoother, easier running unit, permit a drive and motor to fit the working load and not the friction, and assure a reliability that really saves on maintenance.

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IE BEARINGS ARE

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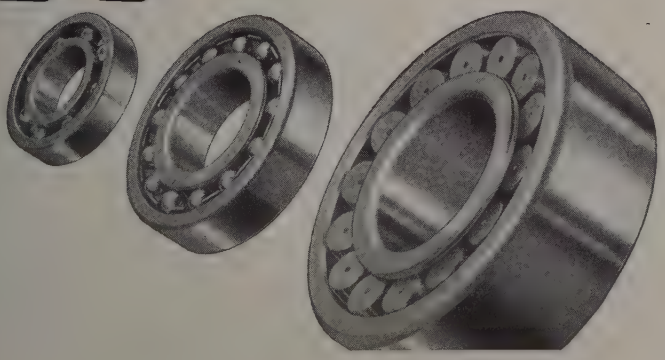
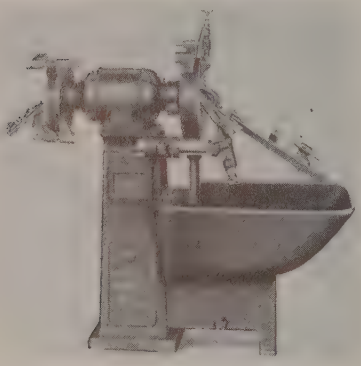
& ROLLER
ARINGS



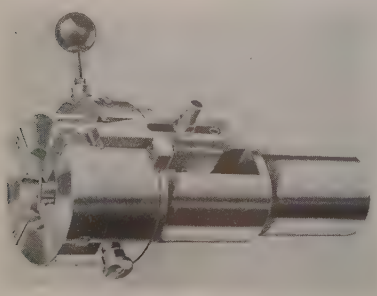
■ Hisey-Wolf Machine Co., Cincinnati, has placed on the market wet drill grinders in six different types which grind straight or taper shank drills with 2, 3 or 4 flutes; flat or chucking drills or flat twisted drills and drills with oversize shanks. Point angle can



be varied from 37 to 70 degrees on holder for large drills. Small drill holder, with snap clamp for straight or taper shanks from No. 60 to ⅜-inch, will grind drills to the standard 59 degree angle at point and 12 degree clearance angle without adjustment. Both holders have V-guides and screw feed.

Taper-Cutting Die Head

■ The Geometric Tool Co., New Haven, Conn., offers a complete line of taper cutting die heads for use



on stationary head hand-operated machines. Taper is controlled by a positive cam. Greater lengths of taper can be cut without projection chasers and length of taper is not limited to height of chaser. There are no lines when the tool opens, and thread is even all the way. Made of alloy steels, tools may be used either as inside or outside trip die-heads.

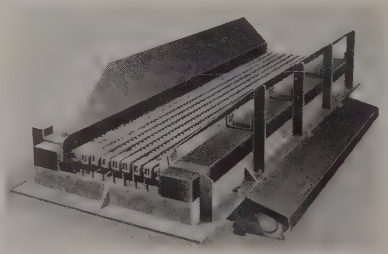
Vernier Time Setting

■ Automatic Temperature Control Co., Philadelphia, announce series 2800, type 2803, Vernier-set timers

capable of setting a time cycle to within a split scale division. Adjustment is maintained without a locking device. Independently wired loads, high voltage operation, and contact modifications are available. All types are equipped with Telechron motor. List price timer without case, $35. Cases, $4 and $5.

Alternate Bar Shake-Out

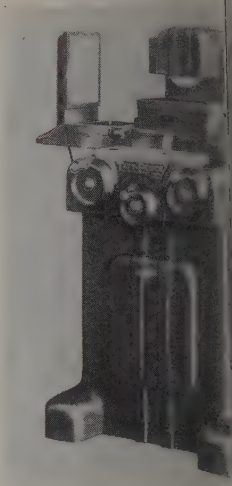
■ Royer Foundry & Machine Co., Kingston, Pa., is marketing a shakeout with a balanced twin cam action operating alternate sets of bars to form a grizzly upon which molds or flasks are placed; shakeout is accomplished by even alternate impulses of rising and falling bars.



Bars can be made to accommodate molds of any size and are particularly adaptable to small molds of intricate castings. Unit can be mounted over a conveyor belt, sand hopper or other type receptacle.

Surface Grinde

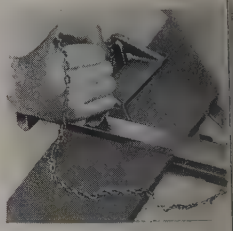
■ Taft-Peirce Mfg. et, R. I., has a ba cision surface grin



tracks to control tabl spindle column travel. uniform parallel and r tions and may be posit with angular surface stead of side.

Squaring Belt-C

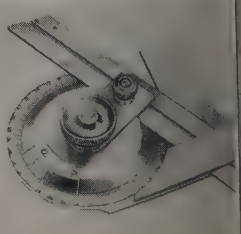
■ Armstrong-Bray & C Loomis street, Chicag a belt cutter which ha fabric and rubber po



sion belts up to 8-inch is held against side special knife is drawn making accurate squar also helps prevent knif ping. Unit is compac may be fastened dow about. Listed at $4.75.

Universal Protrac

■ George Scherr Co., 1 street, New York, anno



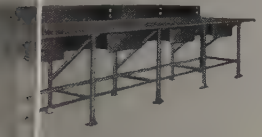
rotractor of Mauser
vith 6, 8 or 12-inch
at each end to 45
degrees respectively.
ed in degrees for the
ernier gives readings
tes. Graduations are
t-black markings.

fety Switch

lectric Products Co.,
apau avenue, Detroit,
d a new 30-ampere
enclosed rocker type
which has molded
by thumb action to
position. Handle and
nism are all one piece,
frictionless knife-edge
rovision is made on
arking circuit legend.
amlined and has posi-
full-floating contacts,
wiring terminals, ten
nockouts and silvered
ng parts.

eel Bench

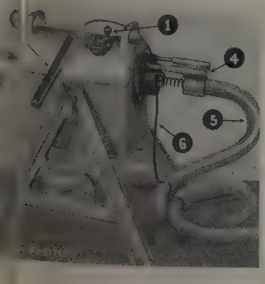
s. Mfg. Co., 5510 North-



y, Chicago, offer an ex-
el bench. Top of bench
⅜-inch steel plate, 24
s wide and 3, 4, 5 and

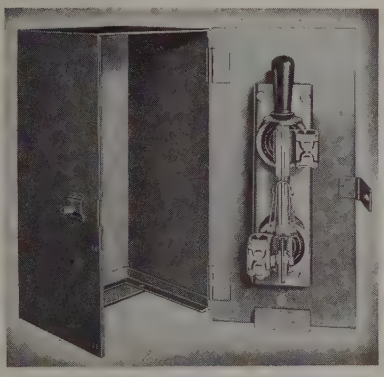
d Ferret

Pipe Cleaner Co., 229
ing, Pittsburgh, has two
ferrets for opening
g clogged pipes of all
y work through traps,
s and U-turns and are
fitting a 15-foot length
coiled cable into a pipe-
clutch to spin cable, re-
tch and feeding again.
cable added as required.
leans ⅜ to 2-inch, and
¾ to 6-inch pipe. Illus-
nodel B shows; 1-electric
utch handle; 3-cable out-
e; 4-slip joint; 5-cable
ctric connection wire.



Hanger Mounted Switch

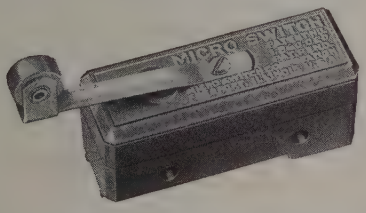
■ Ohio Brass Co., Mansfield, O., announces a quick-break switch for circuits of 110 to 750 volts. The switch is mounted on mine hangers which in turn are mounted on a rustproof hot-dip galvanized steel base. Blades and jaws are of hard, cold-rolled copper. Switch is avail-



able in a locking steel case. Dirigo molded insulation is used in switch with soft rubber on handle.

Small-Movement Switch

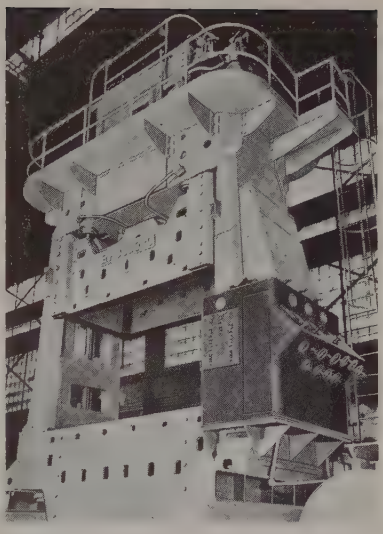
■ Micro Switch Corp., Freeport, Ill., has developed a roller leaf spring switch of ½-horsepower capacity to control motors, heaters, solenoids, etc., from cams, slides or rolls with small moving power. It is of single pole construction and is available in normally open, normally closed or double-throw contact arrangements. Spring is stainless steel ribbed. Roller is 3/16-inch wide and ⅜-inch



in diameter, case hardened and mounted on an oilless bronze bearing. Switch is listed by Underwriters.

Double-Action Hydraulic Press Fully Automatic

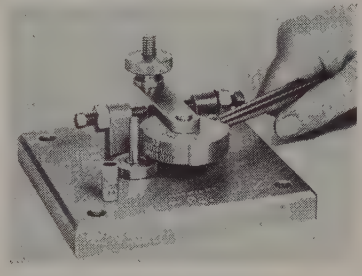
■ Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., announces a double action 735-ton hydraulic press with die cushion. Press is fully automatic and may be operated on any of four sequences. These sequences can be preset to strip work off punch or out of die. Draws of any depth up to 24 inches can be made. All adjustments of working strokes, sequences and speeds can be made by a single operator working at floor level. Press



operates at all practical drawing speeds.

Hand Marking-Machine

■ H. O. Bates, Elizabeth, N. J. has developed a hand marking machine for flat and cylindrical surfaces. Machine will roll a mark (up to 1¼ inches long by ½-inch top to bottom) into plastic as well as metals. Marking is accomplished by



a simple swing of lever after dropping part on arbor. When bolted to bench, thirty or more pieces per minute can be marked.

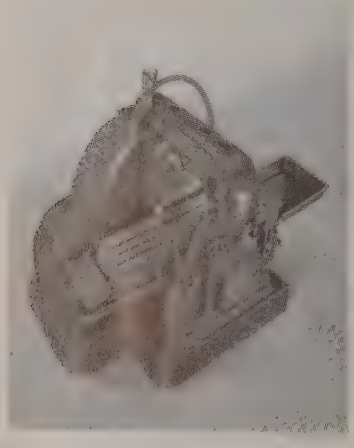
Reams While Threading

■ Landis Machine Co., Waynesboro, Pa., announces a reaming and cham-

fering fixture for use in its 4, 6 and 8-inch stationary pipe die heads. Fixture will ream and chamfer during the threading operation, on all diameters of pipe within capacity of head. Uniform chamfering and reaming is permitted by use of fixture.

Milling Machine Has Automatic Work Cycle

■ Cincinnati Milling Machine Co., Cincinnati, announces its 2-18 and 2-24 plain automatic milling machines of the fixed-bed type with 18 or 24-inch bed travel. Machines have 20 spindle speeds, from 30 to 1200 revolutions per minute and 16 feeds from 1 to 40 inches per minute. To further aid high production milling, an automatic spindle stop, a hydraulic backlash eliminator, and dog-controlled automatic working



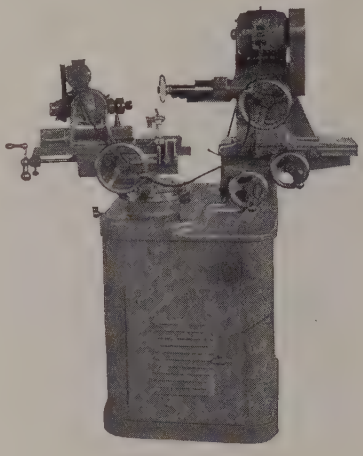
cycles with intermittent feed are provided. Dogs trip table at reversal within 0.005-inch. All automatic in operation, machines reduce hand labor to loading, starting and unloading. Lubrication also is automatic. Coolant pump and piping also available.

Welds Examined By Binocular Magnifier

■ E. Leitz Inc., 730 Fifth avenue, New York, has developed a new binocular prism magnifier for examining welds to determine penetration and porosity, and to find cracks, which are invisible to the naked eye. Visual properties of both eyes are utilized but eyes are not strained or fatigued. Images produced are realistic and objects observed stand out in natural relief.

Small-Tool Grinder

■ Chittenden Corp., 5005 Euclid avenue, Cleveland, introduces a small-tool grinder with work head spindle speed of 200 revolutions per minute. Main slide travel is 5½ inches, 10 inches with auxiliary slide. Vertical angular range of work head is 45 degrees above or below center and main or work-head slide rotates



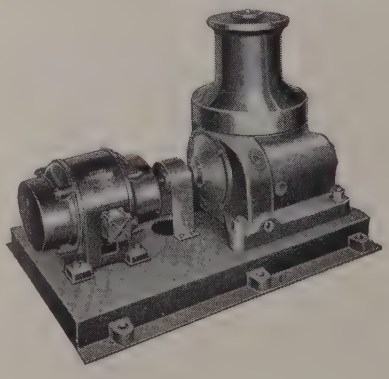
220 degrees in horizontal plane. Transverse slide movement is 6 inches, longitudinal slide movement 7 inches and graduations on vertical hand wheel are for 0.0005-inch.

Streamlined Press

■ Lake Erie Engineering Corp., Buffalo, announces a complete series of hydraulic presses. Frames are streamlined from base to top, and foundation bolts are enclosed within the bed with no projecting flanges. Centralized pushbutton control is mounted flush on the frame for inching, semi and full-automatic operation. Moving platen is guided by adjustable gibs with angular surfaces and is arranged for knockout. Standard equipment includes oil strainers, water cooled oil reservoir for maintaining correct viscosity.

Capstan Car Spotter

■ Link-Belt Co., 307 North Michigan avenue, Chicago, has introduced



two vertical capstan electric car spotters capable of 5000 to 10,000 pounds rope pull. Hig... tric motors drive ... through flexible rolle... ling. Gearing is compl... Ratchet and pawl m... capstan are availabl... cars on incline when ... No. 5-A can move one ... No. 10-A, three to six ... ing on track conditio...

Shear and Flang...

■ Quickwork Co., 400 V... street, Chicago, has dev... work combinatio... throatless shear and ... wide range of sheet ... tion. As a shear, it ... straight and irregula... cluding concave and ... circles and curves of ... length. Smooth, even ... feeding rotary cutters ... to follow the most intr...

Change of head converts ... and shoulders of rolls ... Attachments are availa... shaping, wiring, special ... forming.

Quick-Change Co...

■ New Britain-Gridley ... vision, New Britain M... New Britain, Conn., a... new spring steel precis... collet with quickly cha... A spring tension in coll... "setting." Collet is gr... and outside. Pads also ... inside and outside and lo... undercut shoulder. Two ... front end slide pad firm... seat. Pads may be rem... out disturbing adjustmen... felt plug is placed in ea... collet to prevent coola... chips from washing bac... seat.

rth Bottoms

ed from Page 44)

such as open hearth
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magnesite to be well
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than bottoms hereto-

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own in Table II.
material and labor for
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(at $60.00 per hour),
cent.
he run just completed
able III.
e month of January,
rnace made 78 heats,
age of 135.10 gross tons
erage elapsed time, tap
hours and 36 minutes,
ss tons per hour. This
s tons per 1000 square
rth area and 4,077,900
oss ton of steel. Dur-
k of Jan. 29, 1939, this
de 19 heats, averaging
45 minutes from tap
.43 gross tons per hour,

ace is now in the course
g. Banks and bottom
in excellent shape.

t Ratings

ded from Page 49)

tion 1.0, angle of center
ley material 1.2, service
ad 0.6.
n: 10/[6.7 x 0.65 x 1.0
0.8 x 0.6] = 3.99 inches.
use 4-inch light double

Example No. 2

Determine capacity of
vy, double belt on fol-
e: Lineshaft, 200 revo-
minute, cast iron pulley,
neter x 12-inch face; fan,
ions per minute, cast iron
inch diameter x 12-inch
ing 35 horsepower at this
ditions, tight side above,
ers, drive nearly vertical,
day operation exhausting
working shop, dusty con-

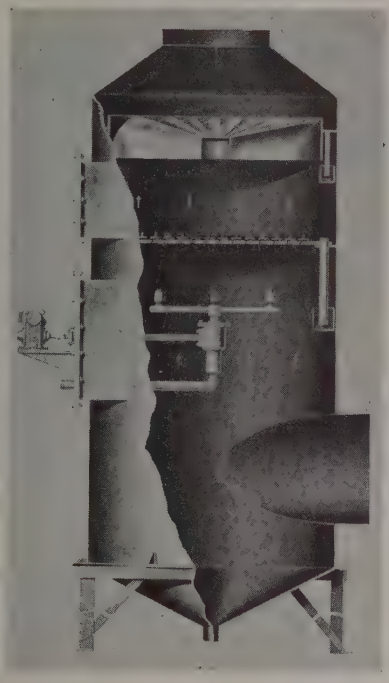
of factors: Belt speed 48
200/12 = 2500 feet per
om Table I, heavy double
ited for 16-inch diameter
m Table I, heavy double
ransmit 8.55 horsepower
f width at 2500 feet per
rom Table II, factor for
stance and small pulley
s 0.80; from Table III, at-
condition 0.7, angle of
center line 0.8, pulley material 1.0, service 1.0, peak load 1.0.

Calculation: 8 x 8.55 x 0.80 x 0.7 x 0.8 x 1.0 x 1.0 x 1.0 = 30.6 horsepower. Therefore, belt not suited for 35-horsepower load. However, this belt can be used if any one of the following changes are made: Use fiber pulley on fan, reduce angle of drive to 60 degrees from horizontal, protect drive from dust, increase pulley diameters to 60 and 20 inches. If it is not practical to change the drive, use a 10-inch, heavy, double belt.

A limitation is necessarily set in the scope of tables of this type. Where speeds over 6000 feet per minute are reached, a leather belting manufacturer should be consulted. This same applies in cases where a pivoted base is installed with the tight side away from the pivot point.

The offer of the American Leather Belting association to render a consulting engineering service to users of leather belting where special conditions exist has been greeted with considerable enthusiasm from many men confronted with transmission problems. With modern leather belting, many applications now are being handled successfully that some years back were beyond the limitations of the product.

Install A PEABODY



TRIPLE ACTION
SCRUBBER
For Cleaning Gas and Air

TRIPLE ACTION, an exclusive, patented development by Peabody, removes dust, ash and fog from gas and air with the thoroughness of three strikes on the batter.

Its effectiveness is amazing. In a recent installation, a Peabody Scrubber 4 feet by 10 feet successfully replaced a packed tower 8 feet by 130 feet high.

A Peabody cleaning unit of suitable design for your purpose can be built into any gas washer without disturbing the arrangement below, assuring clean, dry gas. Also complete new units can be furnished for any desired capacity and degree of cleaning.

PEABODY SCRUBBERS of various types and designs are working successfully in a wide range of industries: taking out tar fog from air in an asphalt plant; removing bacteria from air used in distilling; eliminating moisture and lampblack from gas required for annealing; removing fly ash, etc.

Whatever your problem in gas or air cleaning may be, it will help you to discuss it with our engineers.

PEABODY Bulletin H-201 Describes the Triple Action Scrubber Fully. Send for a Copy.

PEABODY ENGINEERING CORPORATION
580 Fifth Avenue, New York
OFFICES IN PRINCIPAL CITIES

Zinc Dust Paints

(*Concluded from Page* 43)

the standpoint of tint retention since zinc-dust in itself is a tint holding pigment and the outstanding tint retention property of zinc oxide is well known. As a precaution, however, it must be realized that color-stable tinting pigments must be used in colored zinc-dust paints.

However, since the adherence of zinc-dust paints depends upon the amount of zinc-dust in the formulation, the addition of any large amount of tinting color at the sacrifice of zinc-dust entails a loss of adherence. Tinting colors should replace zinc oxide rather than zinc-dust in the formulation. For priming galvanized iron and zinc sheets where adherence is of chief concern, the tinting pigment should not exceed 10 per cent of total pigment weight to meet federal specifications.

Commercial one-coat maintenance paints made up of a pigment combination of zinc-dust and aluminum powder have met with considerable success. The zinc-dust is included essentially for its rust inhibitive properties, the aluminum for the sheen it imparts.

For years zinc-dust paint has been used as an anticorrosive primer for steel ship hulls because it is unaffected by the alkaline salts in sea water. It has been reported that zinc-dust in the usual antifouling liquids has significant action to prevent the fouling of ships' bottoms.

The fact that zinc-dust paint is nontoxic and that excellent paints can be formulated with many of the synthetic resin vehicles now being recommended for use in underwater exposure make it particularly interesting for the inside of drinking water tanks and similar structures.

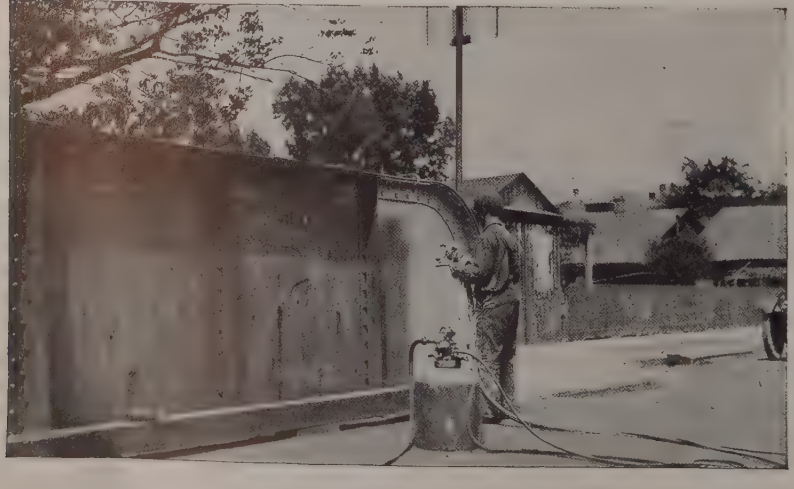
Zinc-dust zinc-oxide paint imparts a newly galvanized appearance to screens and protects them from corrosion. Since it adheres tightly to black iron, galvanized or copper screens, it prevents formation of discolored areas so often observed under screened windows.

Treatment necessary to prepare newly galvanized iron, steel and sheet zinc surfaces before painting involves merely washing the surface with toluol, light gasolene or a suitable solvent prior to painting to remove the light coating of grease normally found on such material.

Where etching or pretreatment is desired to obtain the best possible adherence, a brief weathering period of from one to three months will usually clean and etch the surface sufficiently. This method is feasible wherever painting may be delayed and has the advantage of economy.

Light sandblasting will clean and etch the surface in one operation. This method has the advantage of uniformity and enables immediate painting which should be done as promptly as possible. Ordinary acid etches are not desirable unless used under controlled conditions to insure removal of water-soluble salts and loosely adherent powder which may have a detrimental effect. Commercially pretreated galvanized sheets will produce excellent results when a zinc-dust zinc-oxide priming paint is used.

Here zinc-dust paint is being applied to a metal highway bridge in Pennsylvania. It also is widely used to protect metal cables, guard rails, signposts, culverts, etc.



Creep Data, Ferrous and Nonferrous, Is Assembled

■ *Creep Data,* 864 pages, published by American Society for Testing Materials and America Mechanical Engineers, supplied by STEEL, C $12 in the United States $14 elsewhere; sold in Penton Publishing Co. House, Westminster, L

• A joint research com American Society for terials and American S chanical Engineers, on temperature on the p metals, compiled this contains 486 sheets of t graphs and 37 table wrought steels and fe cast steels and nonferro

Extensive tables gi data on the large num rials considered. There of stress and corresp rate for each type of each temperature; cur perature versus creep ra cent per 1000 hours) fo of material wherever su were available; tabul which give detailed des each material, includin heat treatment, chemi ness, grain size after th Ehn test, impact values. ical properties, manufac room temperature pr specimens after creep characteristics, and as sible photomicrographs initial microstructure of specimens.

Review Surface Ha

(*Concluded from Pa*

der corrosive conditions. ample shafts of pumps h rosive media, and Dr. Ih out that one of the feat silicon case is its ability oil which gives definite sistance during the run riod. The simplest steel results, for example, S Sulphur must be low w cent as maximum. Ma can be impregnated, but erts a more pronounced it does in steel. Plain can not be treated with because it swells badly a perature employed in th Alloy cast irons do not re the chromium types bei larly troublesome.

From the surface of th to a depth of 0.050-inch, t nated silicon content va thus considerable mater machined off without los tage of the silicon case, asserted. Among applic this process are treating der liners, pipe and tube couple tubes, pump sha links, bolts, nuts, nails, s which must resist corros some cases wear as well.

)PPER ALLOY BULLETIN

Reporting News and Technical Developments of Copper and Copper-Base Alloys

"Bridgeport" BRASS CO. 1939

RT ASSEMBLY LIFIED BY BRAZING

ing of steel laminations is veloped by a large electrical to solve the complex fabri- presented by the coil sup- synchronous machinery. In enerators and synchronous densers these supports must ith T-shaped slots for the ng. In the larger machines ssary to use a steel coil sup- on-magnetic section. pports were cast, expensive be necessary for the machin- slots and the non-magnetic er brazing permits an eco- nbly. Sheets of low-carbon netic steel are punched on a mbled on a locating fixture. across the edges of the lami- ld them rigid, the assembly h copper saw cuttings in an f pure dry hydrogen.

inghouse Electric & Manufacturing Company

ings are welded across the edges of hold them rigidly while being brazed. il support after being removed from owing the brazed laminations bonded

hor Bronze Used for ge Bearing Plates

g the unusual combination of ossessed by phosphor bronze is e fabrication of bearing, expan- ed plates in bridge construction. e requires a metal of high ten- th and hardness, as well as ance to corrosion. Cold rolled ronze is especially suitable for se.

EXPERT LABORATORY SERVICE SMOOTHS WAY FOR FABRICATOR OF METAL GOODS

Optimum Combination of Fabricating and Service Characteristics of Any Alloys Can Be Obtained By Closer Cooperation of Manufacturer and User

Fabricators of brass, bronze or copper goods may find through the metallurgical department of the brass mill many opportunities for improving the quality of their products and for effecting substantial savings in manufacturing costs. Although the primary functions of the laboratory are to test incoming raw materials, technically supervise the making of mill products and to check the quality and uniformity of the outgoing metals, as well as develop new alloys and improve old ones, the laboratory because of its highly specialized knowledge is often called upon to help customers in the selection of the proper alloy and temper which will give the best results. The experience gained through working on customers' problems has proved mutually beneficial.

"Special-Purpose" Alloys Developed

The published price lists, for example, contain approximately twenty per cent of the alloys which are actually active in the mill. "Ledrite" brass rod, for example, is a product specially developed for high speed screw machine operation. Although Ledrite will be found entirely satisfactory for 90% of the jobs, additional special operations such as knurling, cold heading, or rolling necessitate alloys with slightly different lead or copper contents or possibly different tempers. Such alloys are supplied if available or are specially developed by the laboratory after studying the customer's needs.

The manufacture of fancy metal boxes, such as vanity cases, lipstick containers, jewel boxes, etc., also presents a problem for both the fabricator and the mill. Since these objects, which compete with the finest jewelry in appearance, are made in quantity at an extremely low price, a brass resembling gold in color is generally used. Metal with an especially fine surface, free from scratches and blemishes, must be supplied, as such operations as matte dipping

(Continued on Following Page, Column 2)

A study of the fabricating operations plus a knowledge of the service requirements of a given job, is necessary to determine the combination of alloy, temper and surface that will insure all-round production economy and maximum service life. In these shells, all fabricated by deep drawing, laboratory control of four different alloys insures economical production and the characteristics required in each finished job.

Metal Cleaner Removes Stains and Oxides

A new substance that cleans by chemical action is reported by the manufacturer to remove oxides and stains instantly from the surface of brass, bronze, and copper. The cleaner contains no abrasives and requires no rubbing. It is applied with a brush and wiped off with a wet rag. It is further claimed to contain no free acid or caustic, so that it will not etch the surface of the metal. It can be used to render working surfaces chemically clean without leaving any gritty residue.

COPPER ALLOY BULLETIN

TYPES OF COPPER

This is the fourth of a series on the various types of copper, their relative merits and uses.

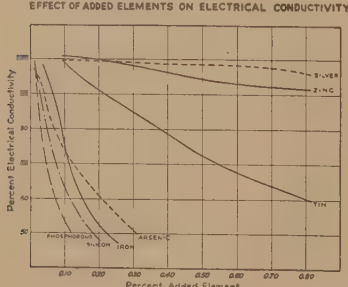
Effect of Other Elements

While oxygen in tough pitch electrolytic copper (as previously discussed) is usually the largest single impurity present, there are sometimes other elements present either by deliberate addition or incidentally to the method of refining, which have a considerable effect on the physical properties. The removal of oxygen by a deoxidizing agent results in the introduction of a small excess of the deoxidizing agent which may also affect the physical properties in various ways.

A typical example of the latter case is the presence of residual phosphorus in Deoxidized Copper. Phosphorus between 0.015% and 0.04% reduces the electrical conductivity of electrolytic copper purity from 3 to 30%, depending on the exact amount of phosphorus present. This decrease in electrical conductivity constitutes a definite objection to the use of phosphorized copper for electrical purposes. Other deoxidizers, such as silicon or zinc, have a greater or lesser tendency to reduce the electrical conductivity.

In the tough pitch coppers certain elements such as arsenic and iron, which have no tendency to deoxidize the copper, do tend to lower the electrical conductivity. Care is therefore taken to make sure that these elements are not permitted in electrolytic copper in appreciable quantities. It is the presence of arsenic in some of the Lake copper which necessitates the division between High Resistance and Low Resistance Lake Copper.

EFFECT OF ADDED ELEMENTS ON ELECTRICAL CONDUCTIVITY



LABORATORY SERVICE

(Continued from Preceding Page, Column 3)

only emphasize any imperfections. Furthermore, polishing and buffing costs must be kept to a minimum.

In order to save material and operating costs, fabricators are constantly cutting down their specifications for metal thickness and making every effort to reduce the number of annealing operations, and often to eliminate them completely. It is therefore necessary to supply thinner material with exceptionally high strength and ductility. Electric furnace brass and scientific grain structure control have made possible the fulfilment of difficult requirements.

Seamless tubing used for fabricating plumbers' brass goods, pump barrels, or parts of various kinds is another mill item which may give trouble if the customer does not tell the mill just what it is to be used for. If the tubing is to be highly polished and plated, extraordinary care must be taken to supply material with a surface free from scratches, blemishes, scale, etc. Furthermore, the tubing must be carefully handled so as not to injure it after it is made. Operations such as bending, flanging or reducing require special tempers and alloys which can be developed only through close cooperation with the laboratory. Wire for severe hot or cold heading operations or for hot forging intricate shapes must also be developed after experimentation if defective work is to be kept down to the minimum.

Just as it is good business for an individual to obtain a periodic health check-up by a competent physician, in the same way, fabricators can benefit by obtaining an occasional survey of their metal requirements by a competent metallurgical laboratory.

An open mind to the possibilities of improvement in old alloys and the economies of many new ones will often result in increased savings and higher quality. Bridgeport's laboratory services are available to customers in working toward such mutually profitable solutions to the fabricator's problems.

NEW DEVELOPM

This column lists items re developed by many different so information on any of these obtained by writing the Bri Company, which will gladly r the manufacturer or other sou

Chemically treated buffs a give longer life against abras are also said to absorb polishi better and to give improved coloring action on the article The chemicals used in treating clude a hygroscopic substance moisture from the air, to give sheeting at all times. Balanced of the buffing textile gives long

A pneumatic sanding dru style fabric band and an air ported to produce a smooth d and to be suitable for use on flexible shaft machines. A ver face is obtained by the soft ai holds the abrasive in place.

A powdered soap is said to use in wet working of brass copper. Applications suggested facturer are drawing and stam copper shells, intermediate yel and tubing, and intermediate

A silver brazing alloy w silver content is suitable for w perature of 1,175 degrees F., w a flux active at 1,100 degrees. produce a sound, ductile bon suitable for making joints betw metals, such as steel and copp alloys.

Bronze inserts formed fro tensile strength are intended for holes in light metals, such as a num or magnesium. The insert the tapped hole and becomes part of the hole. Studs or cap bled into the inserts bear agai instead of the softer metal of

A measuring machine and measuring methods of extrem be used in the shop. It makes inspection and checking of pro with a degree of accuracy us only in the laboratory.

A micrometer gage is ada measurement of internal bore 13/16 to 1 3/8 inches in diamete inches deep. Measurement is t actual diameter of the bore b movable anvil which operates mechanism and rigid adjustab cating scale is graduated in divis

An electric welder is said t ing range from 20 to 280 amp size electrode from 1/16 to 1/4 i for A.C. only, it can be quickl operation at 110 or 220 volts. welding amperage.

PRODUCTS OF THE BRIDGEPORT BRASS COMPANY

Executive Offices: BRIDGEPORT, CONN.—Branch Offices and Warehouses in Principal Cities

SHEETS, ROLLS, STRIPS—*Brass, bronze, copper, Duronze,** for stamping, deep drawing, forming and spinning.

CONDENSER, HEAT EXCHANGER, SUGAR TUBES—For steam surface condensers, heat exchangers; oil refineries, and process industries.

PHONO-ELECTRIC* ALLOYS—High-strength bronze trolley, messenger wire and cable.

WELDING ROD—For repairing cast iron and steel, fabricating silicon bronze tanks.

LEDRITE* ROD—For making automatic screw machine products.

BRASS "Bridgeport" CO.

Established 1865

COPPER WATER TUBE AND FITTINGS—For plumbing, heating, underground piping.

DURONZE ALLOYS—High-strength silicon bronzes for corrosion-resistant connectors, marine hardware; *hot rolled sheets* for tanks, boilers, heaters, flues, ducts, flashings.

BRASS, BRONZE, WIRE—For cap and m wood screws, rivets, bo

FABRICATING SERV Engineering staff, sto for making parts or

BRASS AND COPP "Plumrite"* for plum ground and industrial

*Trade-name.

BRIDGEPORT BRAS

Markets Continue Downward Course

Coal Mining Suspension Factor in Additional Steelmaking Drop

MARKET IN TABLOID ★

Demand

Tending downward; some products are more active.

Prices

Fairly steady, considering small volume of new business.

Production

Declined 1½ points to 49 per cent.

TY in steel markets continues to decline ir- Shrinkage in coal supplies partly is re- for the additional letdown in demand and but this is a minor factor, since districts ly affected by the bituminous suspension also .

oducts show resistance to the downward siness. Bars and sheets, influenced by smaller n the automotive industry in recent weeks, slowly, but structural shapes, concrete re- ars and tin plate continue relatively active. d also shows occasional gains.

nty still clouds the outlook, this being re- he small size of many orders. Consumers are cks in close balance with early needs, while ll operations serve to curtail producers' in- f finished and semifinished products. Ingot was lowered 1½ points to 49 per cent last t some plants is well below the rate of finish- erations. Steelmaking a year ago was 32 per

ile assemblies have started to decline. This pected to continue through the remainder of r and only small steel orders are looked for from partsmakers in connection with 1940 sence of active demand from this industry is for anticipating further recession in steel- coming 60 days.

output last week was off 3640 units to 86,- well ahead of the 50,755 units built a year fer again accounted for the latest change, tput from 23,625 units to 19,325. General eased from 34,405 to 35,005; Ford was steady ll others rose from 10,770 to 10,850.

eks 150,000 Tons ized Sheets Here

ng in the sheet market is an inquiry from 150,000 tons of corrugated galvanized sheets in building air raid shelters. About 100,000 be taken by England, 30,000 tons by Holland mainder divided among other buyers. In- other steel products required in European defense and rearmament activities also are said to be coming to this country as a result of inadequacy of foreign steelworks capacity.

Steel exports from the United States have been increasing lately but are smaller than a year ago. March shipments, excluding scrap, were 162,098 tons, compared with 134,777 tons in February and 188,185 tons in March, 1938. Scrap exports of 310,223 tons in March compared with 222,704 tons in February and 334,742 tons a year ago.

Pending business in shape and concrete bar markets gives assurance of sustained demand for these products for a number of weeks. New orders include 10,000 tons of bars for a government building at Washington. Bridges are prominent among heavy construction work, inquiries being headed by 28,000 tons of shapes for two structures in Maryland.

Low Prices Reflected In Steel Company Earnings

Financial reports of leading steel producers direct attention to the depressing effect of low prices on certain products, but as yet there is no talk of possible advances next quarter. Considering the restricted volume of new business current quotations are somewhat firmer than might be expected.

Steelmaking in certain districts will be curtailed further in the event of prolongation of the coal mining tieup. Pittsburgh and Youngstown areas both held at 43 per cent last week, but Chicago was down 4 points to 49½. Other reductions included 1½ points to 37 in eastern Pennsylvania, 2 points to 63 at Wheeling, 9 points to 37½ at Buffalo, 5 points to 55 at Birmingham and 2½ to 42 at St. Louis.

New England increased 8 points to 43, Cincinnati was up 6 to 52, Detroit rose 2 to 59, and Cleveland advanced 2½ to 39.

Scrap markets are slow, with weakness predominating prices. Reductions at Pittsburgh lower the scrap composite 25 cents to $14.21, a new low for the year to date. The finished steel composite is unchanged at $56.50.

COMPOSITE MARKET AVERAGES

	Apr. 29	Apr. 22	Apr. 15	One Month Ago Mar., 1939	Three Months Ago Jan., 1939	One Year Ago Apr., 1938
Iron and Steel	$36.26	$36.29	$36.32	$36.40	$36.36	$38.61
Finished Steel	56.50	56.50	56.50	56.50	56.50	61.70
Steelworks Scrap..	14.21	14.46	14.46	14.98	14.77	12.30

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, s hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One

Finished Material

	April 29, 1939	March 1939	Jan. 1939	April 1938
Steel bars, Pittsburgh	2.25c	2.25c	2.25c	2.45c
Steel bars, Chicago	2.25	2.25	2.25	2.50
Steel bars, Philadelphia	2.57	2.57	2.57	2.765
Iron bars, Terre Haute, Ind.	2.15	2.15	2.15	2.35
Shapes, Pittsburgh	2.10	2.10	2.10	2.25
Shapes, Philadelphia	2.215	2.215	2.215	2.465
Shapes, Chicago	2.10	2.10	2.10	2.30
Plates, Pittsburgh	2.10	2.10	2.10	2.25
Plates, Philadelphia	2.15	2.15	2.15	2.445
Plates, Chicago	2.10	2.10	2.10	2.30
Sheets, hot-rolled, Pittsburgh	2.15	2.15	2.15	2.40
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.20	3.45
Sheets, No. 24, galv., Pittsburgh	3.50	3.50	3.50	3.80
Sheets, hot-rolled, Gary	2.15	2.15	2.15	2.50
Sheets, cold-rolled, Gary	3.20	3.20	3.20	3.25
Sheets, No. 24, galv., Gary	3.50	3.50	3.50	3.90
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.90
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.35
Wire nails, Pittsburgh	2.45	2.45	2.45	2.75

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$37.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	37.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	37.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	43.00	43.00	43.00	47.00

Pig Iron

	April 29, 1939	March 1939	Ja 19
Bessemer, del. Pittsburgh	$22.34	$22.34	$2
Basic, Valley	20.50	20.50	2
Basic, eastern, del. Philadelphia	22.34	22.34	2
No. 2 foundry, Pittsburgh	22.21	22.21	2
No. 2 foundry, Chicago	21.00	21.00	2
Southern No. 2, Birmingham	17.38	17.38	1
Southern No. 2, del. Cincinnati	20.89	20.89	2
No. 2X, del. Phila. (differ. av.)	23.215	23.215	2
Malleable, Valley	21.00	21.00	2
Malleable, Chicago	21.00	21.00	2
Lake Sup., charcoal, del. Chicago	28.34	28.34	2
Gray forge, del. Pittsburgh	21.17	21.17	2
Ferromanganese, del. Pittsburgh	85.33	85.27	9

Scrap

Heavy melting steel, Pittsburgh	$14.75	$15.75	$1
Heavy melt. steel, No. 2, E. Pa.	13.50	13.375	1
Heavy melting steel, Chicago	12.75	14.25	1
Rails for rolling, Chicago	17.25	17.25	1
Railroad steel specialties, Chicago	14.75	16.25	1

Coke

Connellsville, furnace, ovens	$ 3.75	$3.75	$
Connellsville, foundry, ovens	5.00	5.00	
Chicago, by-product fdry., del.	10.50	10.50	1

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.15c
Chicago, Gary	2.15c
Cleveland	2.15c
Detroit, del.	2.25c
Buffalo	2.15c
Sparrows Point, Md.	2.15c
New York, del.	2.39c
Philadelphia, del.	2.32c
Granite City, Ill.	2.25c
Middletown, O.	2.15c
Youngstown, O.	2.15c
Birmingham	2.15c
Pacific Coast points	2.65c

Cold Rolled

Pittsburgh	3.20c
Chicago, Gary	3.20c
Buffalo	3.20c
Cleveland	3.20c
Detroit, delivered	3.30c
Philadelphia, del.	3.52c
New York, del.	3.54c
Granite City, Ill.	3.30c
Middletown, O.	3.20c
Youngstown, O.	3.20c
Pacific Coast points	3.80c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.95c
Pacific Coast	4.65c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold strip	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, base	2.10c
Sparrows Point, base	2.10c
Claymont, del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c
Pittsburgh	3.35c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	
Gulf ports	
Birmingham	
St. Louis, del.	
Pacific Coast points	

Tin and Terne

Tin Plate, Coke (b

Pittsburgh, Gary, Chic	
Granite City, Ill.	

Mfg. Terne Plate (b

Pittsburgh, Gary, Chic	
Granite City, Ill.	

Bars

Soft Steel

(Base, 3 to 20)

Pittsburgh	
Chicago or Gary	
Duluth	
Birmingham	
Cleveland	
Buffalo	
Detroit, delivered	
Philadelphia, del.	
Boston, delivered	
New York, del.	
Gulf ports	
Pacific Coast points	

Rail Steel

(Base, 15 to 50)

Pittsburgh	
Chicago or Gary	
Detroit, delivered	
Cleveland	

.....	2.10c
.....	2.10c
.....	2.45c
ints	2.70c
ron	
Haute...	2.15c
.....	2.47c
ned....3.50-8.00c	
forcing	
traight lengths, distributors	
Buffalo	
Young.,	
Pitts....	2.05c
ed	2.15c
.....	2.40c
orts.....	2.50c
el.	2.22c
raight lengths, distributors	
ary, Chi-	
o. Cleve-	
gham....	1.90c
ed	2.00c
.....	2.25c
.....	2.35c

ucts

cago-Birm. base keg in carloads

nails	$2.45
nails	$2.45
pound)	
s	3.15c
ples	3.40c
ire, stand-	
age two-	
-rod spool	
int cattle,	
.....	$2.62
wire....	2.95c
re.....	3.35c
cing (base	
)	67.00
bale ties,	
olumn)....	56.00

eturing Trade

Cleve. - Chicago- (except spring ire)

sic wire..	2.60c
e	2.65c
.....	3.20c

ss., $2 higher on and spring wire.

burgh.....$3.60

shed Bars

	Carbon	Alloy
	2.70c	3.40c
	2.70c	3.40c
	2.70c	3.40c
	2.75c	*3.50c
	2.70c	3.40c
	2.70c	3.40c

s (Hot)

to 25 *tons*)

ffalo, Chi-	
llon, Can-	
em	2.80c
red	2.90c

	Alloy
S.A.E.	Diff.
3100.....	0.70
3200.....	1.35
3300.....	3.80
3400.....	3.20
25 Mo.....	0.55
30 Mo. 1.50-	
.....	1.10
Cr.	0.45
flats	0.15
.....	1.20
ts	0.85
.....	1.50
.....	0.85
ts	0.15
nds, squares	0.40
nace up 50 cents.	

Strip and Hoops

(Base, hot-rolled, 1 to 20 tons; cold-rolled, 3 to 25 tons)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham....	2.15c
Detroit, del.	2.25c
Philadelphia, del.	2.47c
New York, del.	2.51c
Cooperage hoop, Youngs., Pitts., Chicago, Birm...	2.25c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.15c

Carbon	Cleve.,	Pitts.
0.26—0.50.....		2.95c
0.51—0.75.....		4.30c
0.76—1.00.....		6.15c
Over 1.00.....		8.35c

Worcester, Mass $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	3.10c
Detroit, del.	3.20c
Worcester, Mass.	3.50c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill.....	$40.00
Relay rails, Pittsburgh 20—100 lbs. 32.50-35.50	
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality..	39.00

Cents per pound

Angle bars, billet, mills.	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham.	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.

Carriage and Machine

½ x 6 and smaller.....68.5 off	
Do. larger, to 1-in.....66 off	
Do. 1⅛ and larger.....64 off	
Tire bolts .....52.5 off	

Stove Bolts

In packages with nuts attached 72.5 off; in packages with nuts separate 72.5-12½ off; bulk 84 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts .....60 off	
Elevator bolts .....60 off	
Plow bolts .....68.5 off	

Nuts

Semifinished hex.	U.S.S.	S.A.E.
6-inch and less..	67	70
⅞—1-inch	64	65
1⅛ and larger..	62	62

Hexagon Cap Screws

Upset, 1-in., smaller.....67.5 off

Square Head Set Screws

Upset, 1-in., smaller.....75.0 off	
Headless set screws.....70.0 off	

Piling

Pitts., Chgo., Buffalo....	2.40c
Gulf ports	2.75c

Rivets, Washers

Structural, Pittsburgh, Cleveland, Chicago ...	3.40c
⅞-inch and smaller, Pitts., Chi., Cleve....65-10 off	
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off	

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
⅛	63½	54
¼	66½	58
1—3	68½	60½

Iron

¼	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld..	27½	14
9 to 12 lap weld...	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O. D.	13	$ 9.72	$23.71
1¾" O. D.	13	11.06	22.93
2" O. D.	13	12.38	19.35
2¼" O. D.	13	13.79	21.68
2¼" O. D.	12	15.16	.....
2½" O. D.	12	16.58	26.57
2¾" O. D.	12	17.54	29.00
3" O. D.	12	18.35	31.36
3½" O. D.	11	23.15	39.81
4" O. D.	10	28.66	49.90
5" O. D.	9	44.25	73.93
6" O. D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O. D.	13	$ 7.82	$ 9.01
1¼" O. D.	13	9.26	10.67
1½" O. D.	13	10.23	11.79
1¾" O. D.	13	11.64	13.42
2" O. D.	13	13.04	15.03
2¼" O. D.	13	14.54	16.76
2¼" O. D.	12	16.01	18.45
2½" O. D.	12	17.54	20.21
2¾" O. D.	12	18.59	21.42
3" O. D.	12	19.50	22.48
3½" O. D.	11	24.62	28.37
4" O. D.	10	30.54	35.20
4½" O. D.	10	37.35	43.04
5" O. D.	9	46.87	54.01
6" O. D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$42.00-43.00
4-in., Birmingham..	45.00-46.00
4-in., Chicago.....	53.80-54.80
6-in. & over, Chicago	50.80-51.80
6-in. & over, east fdy.	46.00
Do., 4-in.	49.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point..	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young., Buffalo, Birm..	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago..	34.00
Detroit, delivered	35.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to $\frac{9}{32}$-inch incl.	43.00
Do., over $\frac{9}{32}$ to $\frac{11}{41}$-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur...	$3.75
Connellsville, fdry..	4.75- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry....	6.50- 6.75
Wise county fdry...	5.50- 5.75
Wise county fur....	4.50- 4.75

By-Product Foundry

Newark, N. J., del...	10.88-11.35
Chi., ov., outside del.	9.75
Chicago, del.	10.50
Milwaukee, ovens..	10.50
New England, del...	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens.	7.00
Indianapolis, del....	10.00
Cincinnati, del.....	9.75
Cleveland, del.....	10.30
Buffalo, del.	10.50
Detroit, del.	10.25
Philadelphia, del...	10.65

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol...	16.00c
Toluol, two degree.....	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	5.75c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia....$28.00	

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$22.00	$22.50	$21.50	$23.00
Birdsboro, Pa.	22.00	22.50	21.50	23.00
Birmingham, Ala.‡	17.38	.....	16.38	22.00
Buffalo	21.00	21.50	20.00	22.00
Chicago	21.00	21.00	20.50	21.50
Cleveland	21.00	21.00	20.50	21.50
Detroit	21.00	21.00	20.50	21.50
Duluth	21.50	21.50	.....	22.00
Erie, Pa.	21.00	21.50	20.50	22.00
Everett, Mass.	22.00	22.50	21.50	23.00
Granite City, Ill.	21.00	21.00	20.50	21.50
Hamilton, O.	21.00	21.00	20.50	.....
Neville Island, Pa.	21.00	21.00	20.50	21.50
Provo, Utah	19.00	.....	.....	.....
Sharpsville, Pa.	21.00	21.00	20.50	21.50
Sparrow's Point, Md.	22.00	.....	21.50	.....
Swedeland, Pa.	22.00	22.50	21.50	23.00
Toledo, O.	21.00	21.00	20.50	21.50
Youngstown, O.	21.00	21.00	20.50	21.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:

Akron, O., from Cleveland	22.39	22.39	21.89	22.89
Baltimore from Birmingham	22.78	.....	21.66	.....
Boston from Birmingham	22.12	.....	.....	.....
Boston from Everett, Mass.	22.50	23.00	22.00	23.50
Boston from Buffalo	22.50	23.00	22.00	23.50
Brooklyn, N. Y., from Bethlehem	24.50	25.00	.....	.....
Canton, O., from Cleveland	22.39	22.39	21.89	22.89
Chicago from Birminghom	†21.22	.....	.....	.....
Cincinnati from Hamilton, O.	21.24	22.11	21.61	.....
Cincinnati from Birmingham	21.06	.....	20.06	.....
Cleveland from Birmingham	21.32	.....	20.82	.....
Mansfield, O., from Toledo, O.	22.94	22.94	22.44	22.44
Milwaukee from Chicago	22.10	22.10	21.60	22.60
Muskegon, Mich., from Chicago, Toledo or Detroit	24.19	24.19	23.69	24.69
Newark, N. J., from Birmingham	23.15	.....	.....	.....
Newark, N. J., from Bethlehem	23.53	24.03	.....	.....
Philadelphia from Birmingham	22.46	.....	21.96	.....
Philadelphia from Swedeland, Pa.	22.84	23.34	22.34	.....
Pittsburgh district from Neville Island	{Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	23.45	23.45	22.95	22.95

	No. 2 Fdry.	Malleable
St. Louis, northern	21.50	21.50
St. Louis from Birmingham	†21.12	..
St. Paul from Duluth	23.63	23.63

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and $26.50, base; $27.74 delivered Philade

Gray Forge

Valley furnace $20.50
Pitts. dist. fur. 20.50

Cha

Lake Superior
do., del Chi
Lyles, Tenn.

†Silvery

Jackson county, O., base: 6-6.50 per cent $25.50; 7-7.50—$26.50; 7.51-8—$27.00; 8-8.50—$27.50; 9-9.50—$28.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same plus $1 a ton.

†The lower all-rail delivered price from Jackson is quoted with freight allowed.

Manganese differentials in silvery iron and ferros $1 per ton add. Each unit over 3%, add $1 p

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky. $60.80

First Quality

Pa., Ill., Md., Mo., Ky.. 47.50
Alabama, Georgia..... 47.50
New Jersey 52.50

Second Quality

Pa., Ill., Ky., Md., Mo... 42.75
Georgia, Alabama 34.20
New Jersey 49.00

Ohio

First quality 39.90
Intermediate 36.10
Second quality 31.35

Malleable Bung Brick

All bases $56.05

Silica Brick

Pennsylvania $47.50
Joliet, E. Chicago..... 55.10
Birmingham, Ala. 47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press $28.00
Wire cut $26.00

Magn

Imported dead
grains, net
Chester, Pa.,
timore bases
Do. domestic
Do., f.o.b. C
Wash., net to
net ton, bags
Quickset mag
grains, f.o.b.
lah. Wash.,
bulk

Basic

Net ton, f.o.b.
mouth Meeting
Chrome brick
Chem. bonded ch
Magnesite brick
Chem. bonded m

Fluorspar,

Washed gravel
paid, tide, net
Washed gravel, f
Ky., net ton, c
all rail $17, b
No. 2 lump ...

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd.... $80.00
Do., del. Pittsburgh... 85.33

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot.. 28.00
Do., 26-28%, Palmerton 33.00

Ferrosilicon, 50% freight allowed, c.l. 69.50
Do., ton lot 80.50
Do., 75 per cent..... 126.00
Spot, $5 a ton higher.

Silicoman, 2½ carbon.. 88.00
2% carbon, 93.00; 1%, 103.00
Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.60-1.65

Ferrovanadium, 35 to 40%, lb., cont...2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 10.50c
Do., ton lots 11.25c
Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained
chrome 16.50c
Do., ton lots 17.25c
Do., less-ton lots 17.75c

	Carloads	Ton lots	Less ton
2% carb...	16.50c	17.25c	17.50c
1% carb...	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots... $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb..... 1.35
Do, less-ton lots..... 1.40
Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls... $2.25
Do, less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill.... 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton. $142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots.... 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots. 160.00
Do, spot, ton lots..... 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, any quantity, freight allowed, lb.... 7.25c
Do, spot carlots, bulk 7.50c
Do, ton lots 8.00c
Do., less-ton lots..... 8.25c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb..... $2.00
Do, smaller lots..... 2.10

Vanadium Pentoxide, contract, lb. contained $1.10
Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c
Do, spot 85.00c
88% chrome, contract... 79.00c
Do, spot 84.00c

Silicon Metal, 1% iron, contract, carlo
⅛-in., lb. ...
Do, 2% ....
Spot ¼c

Silicon Briquets, carloads frei
lowed, ton
Carload, spot
Less-ton lots,

Manganese Bri
contract car
bulk freight
lb. .....
Ton lots ..
Less-ton lots
Spot ¼c

Zirconium Alloy, contract, c
gross ton ....
Do, spot ..
34-40%, contrac
loads, lb., alloy
Do, ton lots
Do, less-ton lot
Spot ¼c

Molybdenum 99%, f.o.b. Yo
200-lb. kegs, lb.
Do, 100-200 lb
Do. under 100

Molybdenum Briquets, 48-5
lybdenum, per
contained, f.o.b
ducers' plant

—The Market Week—

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled	Sheets Cold Rolled	Sheets Galv. No. 24
.....	3.98	4.21	5.21	3.85	3.85	5.66	3.86	4.93	4.61
(etropolitan)...	3.94	4.11	4.11	3.76	3.75	5.56	3.40	4.60	4.50
.....	3.60	3.60	4.10	3.40	3.40	5.00	3.40	....	4.43
.....	3.80	3.95	4.35	3.65	3.65	5.00	3.70	5.05	4.30
.....	4.00	4.15	....	3.85	3.85	5.20	3.90	....	5.40
.....	3.60	3.97	3.97	3.77	3.55	5.40	3.50	4.55	4.40
.....	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.60	4.50
.....	3.50	3.65	3.65	3.55	3.73	5.33	3.50	4.70	4.62
.....	3.43	3.58	3.83	3.75	3.80	5.42	3.58	4.65	4.74
.....	3.85	3.82	3.82	3.80	3.83	5.43	3.57	....	4.57
.....	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.45	4.50
.....	3.85	4.00	4.00	3.80	3.80	5.40	3.75	5.10	4.75
.....	3.73	3.88	3.88	3.68	3.68	5.28	3.63	4.58	4.63
.....	3.72	3.87	3.87	3.47	3.47	5.07	3.53	4.47	4.53
.....	4.15	4.30	4.30	4.10	4.10	5.70	4.10	....	4.75
.....	4.00	4.15	4.15	3.95	3.95	5.71	3.90	....	5.25
.....	3.90	4.05	4.05	3.85	3.85	5.80	3.80	....	4.40
.....	4.64	4.79	4.79	4.41	4.41	6.01	4.47	....	5.47
Ala.	3.50	3.65	3.65	3.45	3.45	5.83	3.40	....	4.75
.....	3.85	4.65	4.65	3.80	3.80	5.75	4.10	....	4.60
.....	3.50	5.85	6.25	4.05	4.05	5.65	3.95	....	5.25
.....	3.65	3.85	5.20	3.40	3.50	5.25	3.95	....	4.75
g.	4.00	4.40	6.10	4.00	4.00	5.50	3.95	6.50	4.75
.....	4.00	4.50	6.35	4.00	4.00	6.20	4.20	6.30	4.75
.....	3.65	4.05	6.00	3.60	3.60	5.20	3.60	6.40	5.15

	Cold Rolled Strip	Cold Finished Bars	SAE Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series	SAE Cold Drawn Bars 2300	SAE Cold Drawn Bars 3100
.....	3.61	4.18	4.23	7.65	6.25	6.00	8.05	8.73	7.33
.....	3.66	4.14	4.14	7.50	6.10	5.85	....	8.69	7.29
.....	3.66	4.11	3.85	7.46	6.06	5.81	8.71	....	....
.....	....	4.10	3.95	....	....	....	....	....	....
.....	....	4.20	....	....	....	....	....	....	....
.....	3.57	3.80	3.80	7.25	5.85	5.60	7.65	8.25	6.85
.....	3.35	3.70	3.80	7.35	5.95	5.70	7.75	8.35	6.95
.....	3.35	3.80	3.70	7.45	6.05	6.05	7.85	8.25	6.85
.....	3.55	3.85	3.58	7.57	6.17	5.92	7.39	8.55	7.15
.....	3.60	4.05	3.90	7.59	6.19	5.94	8.99	8.60	7.20
.....	3.65	3.80	3.80	7.25	5.85	5.60	7.65	8.25	6.85
.....	....	4.39	4.00	7.60	6.20	8.79	9.34	8.94	7.54
.....	....	3.93	3.93	7.48	6.08	5.83	7.88	8.48	7.08
.....	3.76	4.07	3.92	7.62	6.22	5.97	8.02	8.62	7.22
.....	4.46	4.60	....	....	....	....	....	....	....
.....	....	4.61	....	....	....	....	....	....	....
.....	....	4.44	....	....	....	....	....	....	....
.....	....	4.84	....	....	....	....	....	....	....
Ala.	....	4.48	....	....	....	....	....	....	....
.....	5.00	5.10	....	....	....	....	....	....	....
.....	....	5.60	5.65	....	7.80	7.65	8.45	....	....
eg.	....	5.60	6.10	9.00	8.00	7.85	8.70	....	....
.....	4.45	6.50	4.65	9.40	8.55	8.40	9.05	10.40	9.55
co	*9.30	6.55	5.20	9.65	8.80	8.65	9.30	10.65	9.80

on minimum quantity.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, April 27

rices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Quoted in dollars at current value	Continental Channe or North Sea ports, gross tons **Quoted in gold pounds sterling £ s d
90 Si...	$23.45 5 0 0	$17.89	2 2 0
.03-.05	26.97 5 15 0*	16.61	1 19 0 .....
.....	$34.59 7 7 6	$38.34	4 10 0
gage..	53.35 11 7 6	42.60	5 0 0
.....	$44.56 9 10 0	$48.99	5 15 0
.....	2.30c 11 0 0	1.85c to 1.95c	4 15 0 to 5 0 0
.....	2.09c 10 0 0	1.85c to 1.90c	4 15 0 to 4 17 6
5 mm. 4 gage	2.29c 10 18 9	2.10c to 2.34c	5 7 6 to 6 0 0
.....	2.72c 13 0 0	3.02c	7 15 0°
., corr.	3.29c 15 15 0	3.61c	9 5 0
.....	2.77c 13 5 0	2.00c to 2.05c	5 2 6 to 5 5 0
.....	4.08c 19 10 0	2.39c to 2.83c	6 2 6 to 7 5 0
base..	4.86c 23 5 0	3.07c to 3.17c	7 17 6 to 8 2 6
.....	.....	2.73c to 2.93c	7 0 0 to 7 10 0
108 lbs.	$ 4.73 1 0 3	.....	.....

anganese $80.00 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French Francs		Belgian Francs		Reich Mark
Fdy. pig iron, Si. 2.5.	$23.22	4 19 0(a)	$16.44	620.50	$15.21	450	$25.26	63
Basic bess. pig iron..	21.69	4 12 6(a)	.....	...	.....	...	27.86(b)	69.50
Furnace coke.....	5.39	1 4 2	5.96	225	6.83	202	7.62	19
Billets.....	34.59	7 7 6	25.04	945	29.07	860	38.69	96.50
Standard rails.....	1.99c	9 10 0	1.56c	1,300	2.06c	1,375	2.38c	132
Merchant bars.....	2.42c	11 12 0††	1.44c	1,202	1.65c	1,100	1.98c	110
Structural shapes...	2.17c	10 8 0††	1.41c	1,173	1.65c	1,100	1.93c	107
Plates, †¼-in. or 5 mm.....	2.29c	10 19 3††	1.82c	1,515	2.06c	1,375	2.29c	127
Sheets, black.....	3.08c	14 15 0§	2.17c	1,805‡	2.36c	1,575‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm....	3.61c	17 5 0	3.30c	2,750	4.13c	2,750	6.66c	370
Plain wire.....	4.08c	19 10 0	1.92c	1,600	2.48c	1,650	3.11c	173
Bands and strips...	2.58c	12 7 0††	1.71c	1,340	1.95c	1,300	2.29c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 75 per cent over paper sterling.

IRON AND STEEL SCRAP PRICE

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; †indicates broke

HEAVY MELTING STEEL

Birmingham, No. 1	†12.00
Bos. dock No. 1 exp.	13.75-14.00
New Eng. del. No. 1	14.00
Buffalo, N. 1	13.50-14.00
Buffalo, No. 2	11.50-12.00
Chicago, No. 1	12.50-13.00
Chicago, auto, no alloy	11.00-11.50
Chicago, No. 2 auto	10.00-10.50
Cincinnati, dealers	10.75-11.25
Cleveland, No. 1	13.50-14.00
Cleveland, No. 2	12.50-13.00
Detroit, No. 1	10.00-10.50
Detroit, No. 2	8.50- 9.00
Eastern Pa., No. 1	15.50
Eastern Pa., No. 2	13.50
Federal, Ill.	11.00-11.50
Granite City, R. R.	11.50-12.00
Granite City, No. 2	10.50-11.00
Los Angeles, No. 1	12.50-13.50
Los Angeles, No. 2	11.00-11.50
N. Y. dock No. 1 exp.	12.00-12.50
Pitts., No. 1 (R. R.)	16.00-16.50
Pittsburgh, No. 1	14.50-15.00
Pittsburgh, No. 2	13.50-14.00
St. Louis, R. R.	12.00-12.50
St. Louis, No. 2	10.50-11.00
San Francisco, No. 1	13.00-13.50
Seattle, No. 1	12.00
Toronto, dlrs. No. 1	9.75-10.25
Valleys, No. 1	14.00-14.50

COMPRESSED SHEETS

Buffalo	12.00-12.50
Chicago, factory	11.75-12.25
Chicago, dealer	10.75-11.25
Cincinnati, dealers	10.50-11.00
Cleveland	12.75-13.25
Detroit	11.00-11.50
E. Pa., new mat.	15.50
E. Pa., old mat.	11.00-11.50
Los Angeles	12.50-13.00
Pittsburgh	14.50-15.00
St. Louis	9.50-10.00
Valleys	13.50-14.00

BUNDLED SHEETS

Buffalo, No. 1	11.50-12.00
Buffalo, No. 2	10.50-11.00
Cleveland	10.00-10.50
Los Angeles	14.00
Pittsburgh	13.50-14.00
St. Louis	7.00- 7.50
Toronto, dealers	8.25

SHEET CLIPPINGS, LOOSE

Chicago	8.00- 8.50
Cincinnati, dealers	6.25- 6.75
Detroit	7.75- 8.25
†Los Angeles	3.75- 4.00
St. Louis	6.00- 6.50

BUSHELING

Buffalo, No. 1	11.50-12.00
Chicago, No. 1	11.25-11.75
Cincin., No. 1, deal.	7.00- 7.50
Cincinnati, No. 2	2.00- 2.50
Cleveland, No. 2	8.00- 8.50
Detroit, No. 1, new	10.00-10.50
Valleys, new, No. 1	13.25-13.75
Toronto, dealers	4.25- 4.75

MACHINE TURNINGS (Long)

Birmingham	†4.50- 5.00
Buffalo	6.50- 7.00
Chicago	6.50- 7.00
Cincinnati, dealers	4.25- 4.75
Cleveland	7.50- 8.00
Detroit	5.00- 5.50
Eastern Pa.	8.50- 9.00
Los Angeles	4.50- 5.00
New York	†3.50- 4.00
Pittsburgh	9.50-10.00
St. Louis	3.50- 4.00
Toronto, dealers	4.25- 4.75
Valleys	8.50- 9.00

SHOVELING TURNINGS

Buffalo	8.00- 8.50
Cleveland	8.00- 8.50
Chicago	7.50- 8.00
Detroit	6.00- 6.50
Pitts., alloy-free	10.50-11.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	2.00
Buffalo	6.75- 7.25
Cincinnati, dealers	3.00- 3.50
Cleveland	8.00- 8.50
Eastern Pa.	6.50- 7.00
Detroit	5.75- 6.25
New York	†2.50- 3.00
Pittsburgh	8.25- 8.75
Toronto, dealers	5.25- 5.75

AXLE TURNINGS

Boston district	†7.50
Buffalo	9.50-10.00
Chicago, elec. fur.	12.50-13.00
East. Pa., elec. fur.	13.50
St. Louis	9.00- 9.50
Toronto	4.50- 4.75

CAST IRON BORINGS

Birmingham	†6.00- 6.50
Boston dist. chem.	†5.00
Buffalo	6.75- 7.25
Chicago	5.50- 6.00
Cincinnati, dealers	3.00- 3.50
Cleveland	8.00- 8.50
Detroit	5.75- 6.25
E. Pa., chemical	10.00-11.00
New York	†3.50- 4.00
St. Louis	2.50- 3.00
Toronto, dealers	4.25- 4.75

RAILROAD SPECIALTIES

Chicago	14.50-15.00

ANGLE BARS—STEEL

Chicago	15.00-15.50
St. Louis	13.00-13.50

SPRINGS

Buffalo	16.00-16.50
Chicago, coil	15.50-16.00
Chicago, leaf	14.50-15.00
Eastern Pa.	17.50-18.00
Pittsburgh	17.50-18.00
St. Louis	14.00-14.50

STEEL RAILS, SHORT

Birmingham	†12.00-12.50
Buffalo	17.00-17.50
Chicago (3 ft.)	15.50-16.00
Chicago (2 ft.)	16.00-16.50
Cincinnati, dealers	16.25-16.75
Detroit	16.50-17.00
Los Angeles	15.00-15.50
Pitts., 3 ft. and less	18.00-18.50
St. Louis, 2 ft. & less	16.25-16.75

STEEL RAILS, SCRAP

Boston district	†13.50-14.00
Buffalo	16.00-16.50
Chicago	13.00-13.50
Cleveland	16.50-17.00
Pittsburgh	16.75-17.25
St. Louis	13.00-13.50
Seattle	16.00

FROGS, SWITCHES

Chicago	12.50-13.00
St. Louis, cut	13.00-13.50

ARCH BARS, TRANSOMS

St. Louis	13.50-14.00

PIPE AND FLUES

Chicago, net	7.50- 8.00
Cincinnati, dealers	6.25- 6.75

RAILROAD GRATE BARS

Buffalo	10.00-10.50
Chicago, net	7.50- 8.00
Cincinnati, dealers	5.75- 6.25
Eastern Pa.	13.00
New York	†8.50- 9.00
St. Louis	8.00- 8.50

RAILROAD WROUGHT

Birmingham	†11.00-11.50
Boston district	†9.50-10.00
Eastern Pa., No. 1	16.00-16.50
St. Louis, No. 1	9.75-10.25
St. Louis, No. 2	11.50-12.00

FORGE FLASHINGS

Boston district	†8.50
Buffalo	11.50-12.00
Cleveland	11.50-12.00
Detroit	9.00- 9.50
Los Angeles	9.00
Pittsburgh	14.00-14.50

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	15.50-16.00

LOW PHOSPHORUS

Buffalo, crops	16.50-17.00
Cleveland, crops	18.00-18.50
Eastern Pa., crops	17.00-17.50
Pitts., billet, bloom, slab crops	18.50-19.00

LOW PHOS. PUNCHINGS

Buffalo	15.50-16.00
Chicago	15.50-16.00
Eastern Pa., crops	17.50-18.00
Pittsburgh	17.00-17.50
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	†14.00-15.00
Boston	15.00-15.50
Chicago	17.00-17.50
New York	†14.00-14.50
Eastern Pa.	17.00-17.50
St. Louis	16.00-16.50

STEEL CAR AXLES

Birmingham	†15.00-16.00
Buffalo	16.50-17.00
Boston district	†15.00
Chicago, net	17.50-18.00
Eastern Pa.	21.00-21.50
St. Louis	17.00-17.50

LOCOMOTIVE TIRES

Chicago (cut)	15.00-15.50
St. Louis, No. 1	12.25-12.75

SHAFTING

Boston district	†15.25-15.75
New York	
Eastern Pa.	
St. Louis, 1¼-3	

CAR WHEELS

Birmingham	
Boston dist., iro	
Buffalo, steel	
Chicago, iron	
Chicago, rolled	
Cincin., iron, de	
Eastern Pa., iro	
Eastern Pa., ste	
Pittsburgh, iron	
Pittsburgh, stee	
St. Louis, iron	
St. Louis, iron	

NO. 1 CAST SCR

Birmingham	
Boston, No. 1 ma	
N. Eng. del. No.	
N. Eng. del. tex	
Buffalo, cupola	
Buffalo, mach.	
Chicago, agri. n	
Chicago, auto n	
Chicago, railroad	
Chicago, mach. n	
Cincin., mach. d	
Cleveland, mach	
Eastern Pa., cup	
E. Pa., mixed y	
Los Angeles, net	
Pittsburgh, cupol	
San Francisco, d	
Seattle	
St. Louis, cupola	
St. Louis, agri. m	
St. L., No. 1 mach	
Toronto, No. 1, mach., net	

HEAVY CAST

Boston dist. brea	
New England, de	
Buffalo, break	
Cleveland, break	
Detroit, auto net	
Detroit, break	
Eastern Pa.	
Los Ang., auto, n	
New York, break	
Pittsburgh, break	

STOVE PLATE

Birmingham	
Boston district	
Buffalo	
Chicago, net	
Cincinnati, dealer	
Detroit, net	
Eastern Pa.	
New York, fdy.	
St. Louis	
Toronto dealers, n	

MALLEABLE

Birmingham, R. R.	
New England, del.	
Buffalo	
Chicago, R. R.	
Cincin., agri., deal.	
Cleveland, rail	
Eastern Pa., R. R.	
Los Angeles	
Pittsburgh, rail	
St. Louis, R. R.	

Iron Ore

Lake Superior Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbes.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbes.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-9.25
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, c.i.f. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	12.00
Swedish low phos.	12.00
Spanish No. Africa basic, 50 to 60% nom.	9.00- 9.50
Tungsten, sh. ton unit, duty pd. nom.	19.00-19.50
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$23.00-24.00
Molybdenum ores sulphide, per lb.	

molybdenum con tained, f.o.b. mi

Manganese

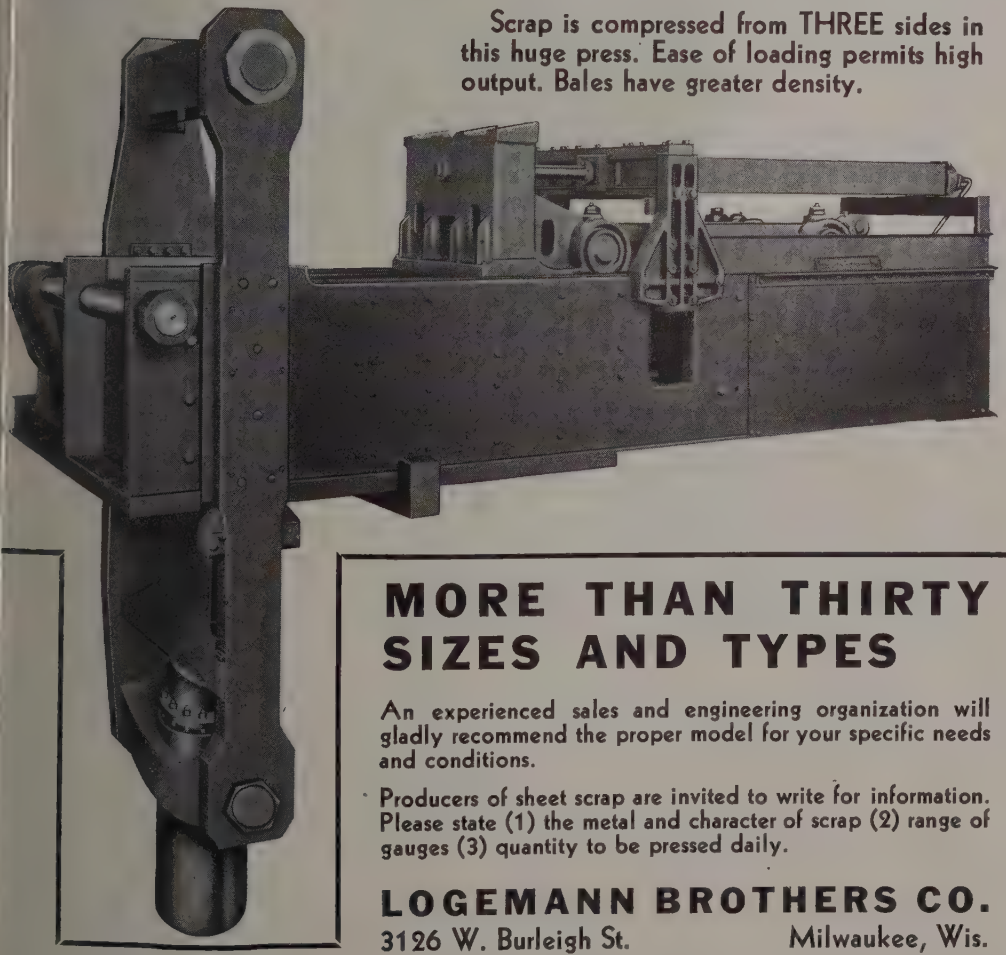
Prices not including per unit carg

Caucasian, 50-52% nom.	
So. African, 50-52% nom.	
Indian, 49-50%	

LOGEMANN

SCRAP PRESSES

POWERFUL RUGGED RELIABLE



Scrap is compressed from THREE sides in this huge press. Ease of loading permits high output. Bales have greater density.

MORE THAN THIRTY SIZES AND TYPES

An experienced sales and engineering organization will gladly recommend the proper model for your specific needs and conditions.

Producers of sheet scrap are invited to write for information. Please state (1) the metal and character of scrap (2) range of gauges (3) quantity to be pressed daily.

LOGEMANN BROTHERS CO.
3126 W. Burleigh St. Milwaukee, Wis.

Baling Presses . . . Pumps . . . Straighteners . . . Accumulators . . . Valves

Sheets, Strip

Sheet & Strip Prices, Pages 82, 83

Cleveland—A few orders have been received from partsmakers for 1940 automobile models, but only small lots are involved and larger tonnages are not expected for a number of weeks. Parts manufacturing for new cars in some instances will start in May, however. Sheet and strip demand elsewhere is marked by continued cautious buying, with the tendency in total business downward.

Chicago—Sheet and strip production is following the declining trend in demand. Reduction is noted in both size and number of new orders, although business is sustained in some directions. Household equipment manufacturing accounts for a fair demand, while needs of farm equipment builders also are little changed.

Boston—Although in spots slight improvement in buying of specialty grades of narrow strip is noted, pro-

ducers in the New E find April tonnage of cent from March. Sor out of the market fo are placing small ton tively for prompt de strip operations are cent of capacity wit There is some scatter ing.

New York—Negotiat der way last week for by a number of Europ of approximately 150,0 gage corrugated galv The material would b construction of air rail this total 100,000 tons land, 30,000 tons for Ho remainder scattered.

While part of this reported to have been a United States Steel sidiary, negotiations stil conducted late in the distribution of orders despite divergence in p buyers and sellers. Ba export offerings recent mated this material wo about $75 a gross ton, seaboard, or a total of

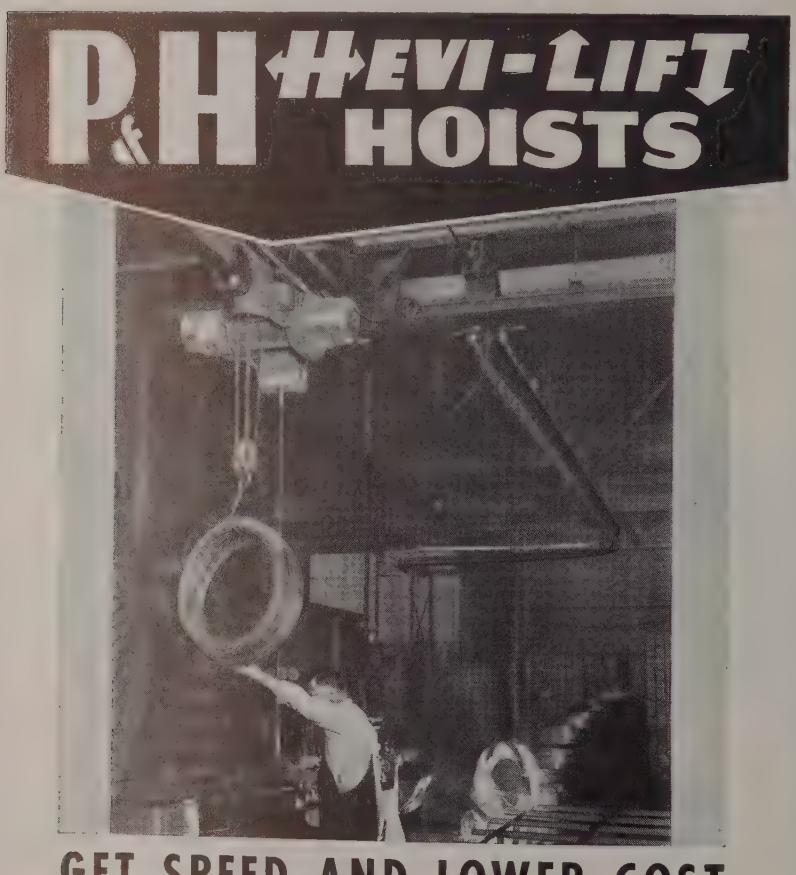
April sheet business was off from March, a some sellers the decreas Makers of miscellaneou are among the most act ers and are figuring or size work, including ab of hot-rolled sheets, prin 20 gage, for practice b quantity differentials s received little test.

Philadelphia — April were down rather s from March. Jobbers a ing lightly and manufa miscellaneous stampings ing largely on stocks. T been so light that the n of quantity extras and has not been tested.

Buffalo—Sheet and st has tapered further. Re automotive interests hav markedly. Household makers are taking larger Better business is in pros aircraft builders.

St. Louis—New orders ments have tended dow past several weeks, the l crease being shown in fr ings. Users are holding c mitments to early req Resumption of operations stove plants recently has flat-rolled steel shipments industry, but furniture a hold equipment makers ar tive buyers than during f ter.

Birmingham, Ala. — Li is noted in demand for she



GET SPEED AND LOWER COST WITH "THRU-THE-AIR" HANDLING

Off the floor! . . . out of the aisles! . . . "thru the air" handling give you swift, effortless movement of loads — saves money, saves man power, saves time. P&H hoist engineers will gladly recommend the most practical material handling methods for your individual needs. Why not investigate? Or ask us to send your copy of Bulletin H-5? The Harnischfeger Corporation, 4411 W. National Ave., Milwaukee, Wisconsin.

HARNISCHFEGER CORPORATION

HOISTS • WELDING ELECTRODES • MOTORS P&H EXCAVATORS • ELECTRIC CRANES • ARC WELDERS

Market Week—

emaining near capac-
acturers' and roofing
about even. The cot-
still is awaited for an
demand for strip.

es

Prices, Page 82

—River craft building
y the placing of 30 coal
lving about 4500 tons of
teel, by American Roll-
. Twenty will be built
Mfg. Co., ten by St.
uilding Co. Part of the
ntract is expected to be
nits built recently for

Except for an upturn in
es for structural work,
d is little changed. Pub-
rojects are slightly less
but with oil refinery and
truction, they lend consid-
ort to the market. A
in railroad car needs is
while shipbuilding con-
tor.

lphia — Plate sellers gen-
rt a rather appreciable
ew business last month.
g Co. has not yet issued
ainst orders placed a
r plates for car repairs,
eing due, it is said, to
uation. Little ship ton-
en placed here recently
mbined with lack of im-
k and boiler work, has
recent dullness.

ncisco—Only two plate
size were reported dur-
k. Youngstown Sheet &
ooked 500 tons for the
reclamation for delivery
nto, Calif., and Western
el Co. 275 tons for liner
the United States engi-
Los Angeles. So far
16,307 tons have been
pared with 12,578 tons
e period a year ago.

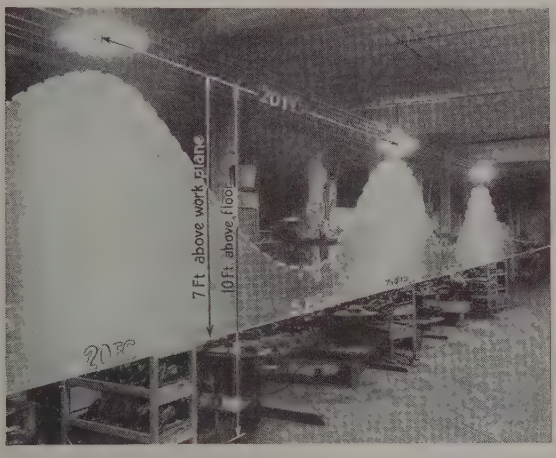
ntracts Placed

reau of reclamation, invita-
-A-1, for delivery at Sacra-
ff., to Youngstown Sheet &
Youngstown, Ohio.
er plates, United States en-
ce, Los Angeles, to Western
el Co., Los Angeles.

er Price Reduced

immediately, a reduction
per cent in prices of tri-
ne and perchlorethylene,
degreasing and dry clean-
en announced by the R.

HAVE YOU GOT ROLLER COASTER LIGHTING IN YOUR PLANT?



With lighting fixtures too far apart, poor distribution as shown in the top illustration, is the result. For best seeing conditions, the illumination in foot-candles throughout the work area should be reasonably uniform. Properly spacing the lighting fixtures, as shown below, results in greater uniformity.

"ROLLER COASTER" lighting is poorly distributed or uneven lighting. When the amounts of light directly beneath a light source and midway between light sources vary greatly, you have a lighting curve that resembles a roller coaster with its sharp dips and climbs.

The extreme contrasts that exist between bright and dim areas may cause eyestrain . . . slow up production . . . increase operating errors . . . and constitute accident hazards. Seeing is difficult because workers' eyes are continually trying to adapt themselves to the many lighting conditions in the working area.

In general, direct lighting units should be spaced no further apart than their height above the floor. Where supplementary lighting is required, general lighting should also be used.

Write General Electric Co., Dept. 166-S—E, Nela Park, Cleveland, O., for the new booklet, "Lighting for Production in the Factory."

GENERAL ELECTRIC

MAZDA LAMPS

They stay brighter longer

& H. chemicals department of E. I. du Pont de Nemours & Co., Wilmington, Del.

Bars

Bar Prices, Page 82

Pittsburgh — Bar orders are off slightly, although the decline in automotive buying partially is offset by gains from miscellaneous sources. Little additional demand is expected necessary to complete production of 1939 automotive models. Business from farm equipment builders has been slightly better lately but is regarded as below normal. Merchant bar prices generally are steady.

Cleveland — Bar sales show only small change, but the trend continues downward. However, the letdown is less rapid since early April and demand occasionally gives signs of leveling off around recent levels. Orders are maintained better from miscellaneous users than from automotive interests, although the tendency to curta individual purchases possible is fairly gene

Chicago — New busi slipped well below the Demand continues w fied and in some insta ed upward. Buying is mediate needs and st consumers are extrem

Quantity deductions merchant bars, shape have been revised. I duction of 10 cents pe now applies on orders or over, compared with over formerly. A 5-c is effective on lots un tons, instead of unde tons. The former 2.5 on under 100 to 50 t dropped, the next clas ing 50 to 15 tons, on w price prevails as befo extras on orders of less are unchanged. Deduc ly are 5 cents per 100 than those on hot-roll bon bars.

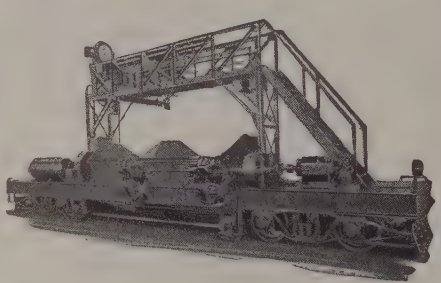
Philadelphia—While from machine tool b been fairly steady, t here remains light. La from railroads is being felt, and less tonnage is from shipyards, althou ter situation is regar temporary. In fact, ne so should see considera work active. Cold dra alloy bars remain rel active than hot carbon

Buffalo—Bar mill op slightly heavier, influe creased output for one account and by a gain releases. No general u mand for automotive m early prospect.

ATLAS SCALE CARS

20 Ton — Double Compartment Scale Car. Journals provided with self aligning anti-friction bearings. Equipped with Atlas Indicator and Recorder.

20 Ton Two Compartment Scale Car with Orr Bin Gate Operating Mechanism. Anti-friction bearings. Equipped with Atlas Indicating and Recording Mechanism.



Other Atlas Products

Gas-Electric and Diesel-Electric Locomotives—Car Pushers—Storage Battery Locomotives—Electrically Operated Industrial Cars—Scale Cars and Weighing Cars of all kinds — Ore Transfer Cars and Blast Furnace Charging Cars.

Coke Oven Equipment

Pushers and Levellers—Coal Charging Cars—Door Handling Machines — Coke Quenching Cars.

Also Atlas Patented Indicating and Recording Mechanism for Weighing Scales.

THE ATLAS CAR & MFG. CO.

Engineers . . . Manufacturers

CLEVELAND, OHIO

Pipe

Pipe Prices, Page

Pittsburgh—Lighter oil country goods largel sible for a slight decli bookings the past 30 ever, standard pipe a been increasing steadily ing the best month so f in this respect. Gains construction are expect en this market well in Improvement in shipme bers in April was mor sonal. Demand for pr mechanical tubing sh change.

Cleveland—Pipe busine erately heavier. April vorable comparison with

the letdown in demand steel products. While well drilling still is a actor, orders for casing ved slightly, and several rs for line pipe lately d bookings. Shipments pipe are sustained in ons and tending upward response to increased rom distributors' stocks. rk—About 250 tons of plumbing pipe for city eth, N. J., will be fur- an eastern mill. Mean- ns of heating and plumb- Hunter college and pub- and 300 tons for the ong Island, courthouse . Merchant pipe demand in April was down sub- rom March.

hia — Approximately 500 nch steel pipe is expected ed shortly for the Wild , Bethlehem, Pa. Mean- tons of 84-inch pipe, con- , Clark Valley dam, Har- ., has been placed with Steel Co., Bethlehem, Pa.

am, Ala.—The pipe plant steadily improving be- potty but formidable or- five-day schedule re- effect, and inquiries are

e Placed

to 18-inch, Oceanside, Calif., States Pipe & Foundry Co., N. J.

o 12-inch, Brookline, Mass., on Iron Works, Emaus, Pa.

o 8-inch, Woonsocket, R. I., Pipe Co., Everett, Mass.

e Pending

to 12-inch, San Bernardino, May 2.

0-inch, sewage plant, New nn.; bids in.

e Placed

-inch pipe, contract No. 3, ey dam, Harrisburg, Pa., to Steel Co., Bethlehem, Pa.

inch, for Grand Coulee dam, ted Pipe & Supply Co., St.

e Pending

-inch pipe, Wild Creek dam, , Pa., bids in.

late

Plate Prices, Page 82

production continues to adually, being estimated nt last week, up 2 points. re gaining slowly, and al- though the food canning season is not due to start for another 30 days, canmakers are anticipating heavier releases of containers. Inventories of both tin plate and cans are relatively small.

Wire

Wire Prices, Page 83

Pittsburgh—Although demand for merchant wire products has leveled off, sellers look for another upturn before the season closes. Lateness of spring buying has made it difficult to anticipate needs in many sections. Business in manufacturers' wire is spotty, with miscellaneous consumers accounting for a large part. Automotive tonnage is relatively light. Manufacturers' wire prices are steady, with merchant products showing little more than usual weakness in some districts.

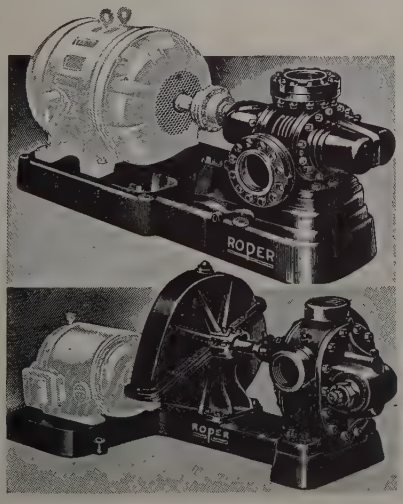
Cleveland—Wire mill operations are fairly steady, but a decrease in new business during April gives a less favorable outlook to May pro-

Faithful

Always trustworthy . . . always ready to start and finish a pumping job with the highest degree of efficiency. That's Roper Pumps!

They are engineered and built with a minimum of working parts, a stamina that assures years of service, and a smooth freedom that sets a higher maximum for speed.

If you are using Roper Pumps you know of their money-saving efficiency . . . if you're not using Ropers, won't you let us tell you how they operate with a lower power consumption and reduce costs to the lowest possible level?



● **Roper Pumps are**

easy to install . . .
easy to service
and Low in cost . . .

GEO. D. ROPER CORP.
Rockford, Illinois, U. S. A.

ROPER
TRADE MARK REG. U.S. PAT. OFF. REG. IN CANADA
Rotary PUMPS
DEPENDABLE SINCE 1857

duction. Merchant products continue to make a better showing than manufacturers' wire, the letdown in demand the past 30 days having been relatively small. Stability of prices is regarded as satisfactory, considering the volume of business.

Boston — Demand for wire products continues slack, with the aggregate volume of April business slightly below March. While orders are fairly numerous, few large releases are being made, and practically all business is for prompt delivery. Finishing operations barely hold at around 50 per cent in most departments. The drag is notably evident among some of the normally larger consumers who are buying close to requirements.

Rails, Cars

Track Material Prices, Page 83

Placing of 1000 cars by Great Northern with Pullman-Standard Car Mfg. Co., Chicag[o] tonnage of rails by Western, divided betw[een] Illinois Steel Corp. an[d] Co. constitute the on[ly] railroad buying.

It is not likely the [Pullman] steel for 1150 cars [for] Missouri Pacific wit[h] Car Mfg. Co. will be [let] other month. The cars [are] ed at once and probab[ly] livered in the fall. I[t] about 9000 tons will b[e] Chicago mills and 60[0] St. Louis producers.

Placing of 600 cars [for] ver & Rio Grande West[ern] for the Illinois Central soon.

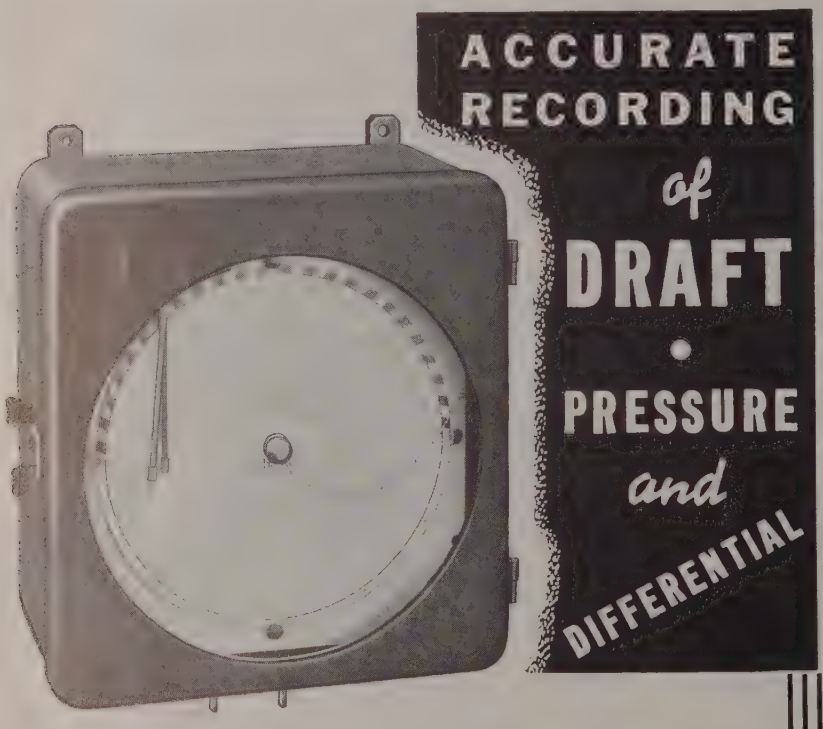
Car Orders Placed

Great Northern, 1000 fifty cars, to Pullman-Stand Co., Chicago.

Pullman Co., two sleeping man-Standard Car Mfg.

Rail Orders Placed

Grand trunk Western, 20[0] tons to Carnegie-Illinois Pittsburgh, 530 tons to Co., Chicago.



Two draft values, two pressure values, two differential values, or a combination of any two of these three values may be recorded. Hays Draft Recorders are sensitive enough to register accurately increments of .0025 inches water yet are built husky enough to withstand the jars and dirt of steel mill operations.

THE OPEN HEARTH FURNACE is a very leaky structure at best. Therefore, draft conditions within the furnace are apt to be variable. The only way to prevent large leakage of gases is to maintain balanced draft conditions in the hearth.

The *Hays Series OT Supersensitive Draft Recorders* keep an accurate record of draft, pressure or differential—knowledge very essential to effective furnace operation. By connecting the instrument with the risers from the checker chambers to the furnace at a point just above the level of the charging floor a permanent record is made of pressures and drafts at these points. Balanced conditions on each end can be readily obtained and the amount of this draft is an indication of the draft on the bath.

Write for detailed information to 960 Eighth Avenue, Michigan City

The HAYS CORPORATION
SINCE 1901 COMBUSTION INSTRUMENTS AND CONTROL
MICHIGAN CITY, INDIANA, U.S.A

Shapes

Structural Shape Prices

Pittsburgh—New proje[cts] ticularly heavy, being i[n] two large bridge jobs. the superstructure of t[he] hanna river bridge at Grace, Md., will take while the superstructure tomac river bridge be[tween] gren, Va., and Ludlow calls for 13,000 tons. Th[e] mot street bridge here, 2000 tons while two priva[te] quire 900 tons each. private work is increasi[ng]

Chicago—Awards conti[nue] uptrend, lending consi[der] couragement to produce ing slack demand for o[ther] of steel. Numerous subst[an] nages are pending, some are recent projects. Lea[ding] involved 1500 tons for n[ew] booked by Harnischfe[ger] Milwaukee.

New York—Orders for structural steel during creased 10 per cent over according to reports recei[ved] American Institute of S[teel] struction. First quarte[r] booked totaled 272,160 to[ns]

in the initial quarter
Shipments during March
gest of any month this
s for March were: Book-
tons; Shipments, 122,-

Contracts are lagging,
n public work outstand-
e requirements include
dy 500 tons awarded for
ostly I-beam spans. Dis-
acklogs are light and op-
lower.

ia—Fabricators are fig-
000 tons for a bridge su-
Havre de Grace, Md.,
izable tonnage for the
ederal office building,
, the latter up for bids
anwhile, structural buy-

– Interest is focused on
of bids May 4 for Buf-
2,700,000 convention hall,
pproximately 3000 tons
al and 550 tons of rein-

Pacific Car & Foundry
, has orders on its books
n present operations for
nths. Bethlehem Steel
rnish 800 tons involved
sion towers for the Bon-
hority. Contract to fab-
ons for two state bridges
went to Mississippi Val-
ral Steel Co., St. Louis.
cisco—Recent awards are
ng only 1168 tons. This
e year's aggregate to
, compared with 43,280
38. Consolidated Steel
ed 380 tons for an addi-
Los Angeles court house
ffice.

Contracts Placed

fteenth street viaduct, Kan-
Mo., to American Bridge Co.,

avy cranes, to Harnischfeger
waukee.

uilding, state liquor control
arrisburg, Pa., to Bethlehem
Bethlehem, Pa.. Through

typographic error this contract was noted last week as involving 2100 tons.

1200 tons, grade separations, Cross Island parkway, Brooklyn, N. Y., for New York city parkway authority, to Bethlehem Steel Co., Bethlehem, Pa.

1200 tons, food market, Kansas City, Mo., to Mississippi Valley Structural Steel Co., St. Louis.

1150 tons, grade eliminations, contract Sc-39-5, Queens, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

1100 tons, garage, sanitation department, 215th street and Tenth avenue, New York, to American Bridge Co., Pittsburgh; through procurement division, treasury department, New York.

1075 tons, auditorium, Bloomington, Ind., to R. C. Mahon Co., Detroit.

800 tons, transmission towers for Bonneville authority, to Bethlehem Steel Co., Bethlehem, Pa.

500 tons, factory building, for Allis-Chalmers Mfg. Co., Pittsburgh, to Bethlehem Steel Co., Bethlehem, Pa.

500 tons, post office, St. Louis, to Atlas Iron Works, St. Louis.

475 tons, north metropolitan relief sewer, contract 96A, Boston, to Commercial Shearing & Stamping Co., Boston.

475 tons, steel curbing, Brooklyn, N. Y., to Phoenix Bridge Co., Phoenixville, Pa.

450 tons, dumping platform and shed, pier 99, New York, to American Bridge Co., Pittsburgh.

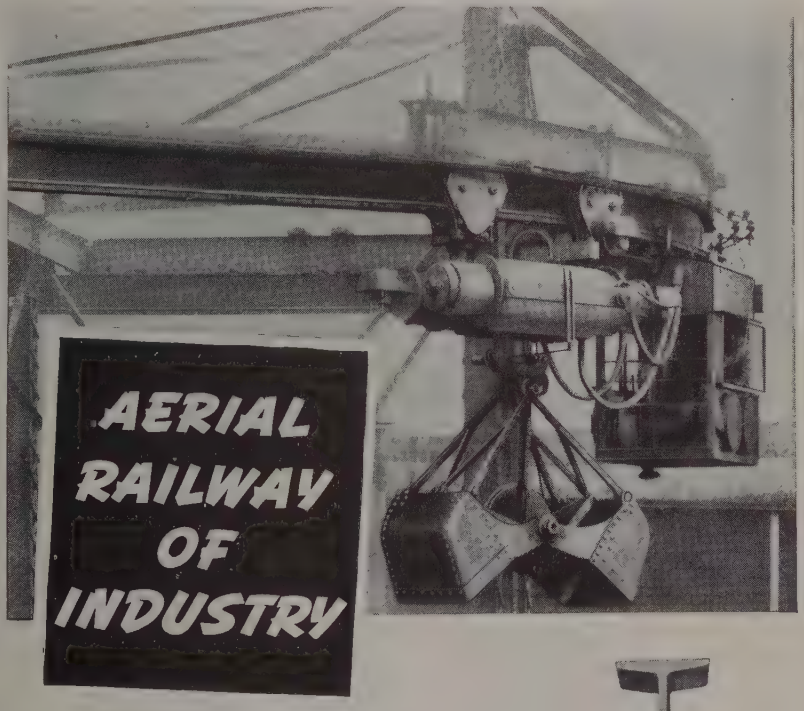
425 tons, two state bridges in Montana, to Mississippi Valley Structural

wards Compared

	Tons
d April 29	20,638
d April 22	*25,416
d April 15	36,266
, 1938	22,349
erage, year, 1938	21,566
erage, 1939	24,704
erage, March	21,240
ate, 1938	291,054
ate, 1939.....	*395,267

t.

wards of 100 tons or more.



• One Shepard Niles electric monorail hoist gives "express service", indoors or out to any point in the plant or yard carrying loads of every description. Furnished with single or double hooks in capacities from ⅛ to 10 tons.

They are also ideally suited to the accurate control of any standard electromagnet or grab bucket.

Write for catalogs illustrating and describing the "Aerial Railway of Industry".

Shepard Track consisting of two special analysis T-rails clamped to the bottom flange of a standard I-beam insures a smooth, hard, long-wearing track for monorail hoists.

A COMPLETE LINE OF CRANES & HOISTS

SHEPARD NILES CRANE & HOIST CORP.

358 SCHUYLER AVENUE . . . MONTOUR FALLS, N. Y.

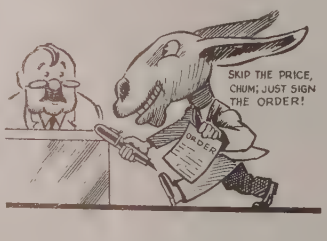
Behind the Scenes with STEEL

Pittsburgh Pun

■ In from Pittsburgh last week to attend the very successful Open Hearth conference (see pages 22 and 23) came the dean of STEEL's space peddlers with a very, very lousy pun. "Make a sentence", he says, "using the word Heppenstall (*adv.*)." In exactly eight minutes we give up and he gleefully gives his version: The old timer on WPA calls the newcomer over to him and says, "What for are you workin' so hard? Why don't you get *Hepp-n-stall!*"—And to think they shot a man like Lincoln!

A Donkey Tale

■ This little yarn from *The Illinois Editor* may very well cause a few red faces but t'ain't our fault if the shoe fits.—Once upon a time a great prophet addressed a herd of donkeys: "What would a donkey require for a three-day journey?" *Six bundles of hay and three bags of dates,* they replied. "That soundeth like a fair price. But I have for only one of you a three-day journey, and I cannot give six bundles of hay and three bags of dates, who will go for less?" Behold, all stood forth. One would go for six bundles of hay and two bags



of dates, another for three bundles of hay and one bag. And one especially long-eared donkey agreed to go for just one bundle of hay. Spake the prophet: "Thou are a disgrace to the herd, and an ass. Thou canst not live for three days on one bundle of hay, much less undertake the journey and profit thereby." *True,* replied the ass, hanging his long ears in shame, *but I wanted to get the order!* And from that day to this, price cutters have been known as asses.

Barter

■ There is a fellow down in Philadelphia who has 6000 boxes of standard wire staples with 5000 in a box, which is approximately 30 million staples. He just happened to pick them up cheap at a liquidation, he says, and would now like very much to get rid of them at maybe a small profit. We have relieved him of 20,000 of the little things in lieu of two bucks he owed us, so if you want to get in on this quick before they're all gone, let us know.

Bridge of Size

■ While writing this, we haven't yet heard what Herr Hitler had to tell his boys in the Reichstag this morning but we have been musing over the latest map of Europe on our desk. Yesterday, *Etaoin* pulled a "Do You Know?" on us to the effect that the paper used in the pages of STEEL's 12,000 copies each year would, if laid end to end, reach from Berlin to Paris. This STEEL bridge would be a little over eight feet wide and would weigh 550,000 pounds, we learn also. We are seriously considering dispatching a proposition, post haste, to Mr. Hitler to see if he would like for us to start construction.

Squelched

■ Never again will we lay ourselves so wide open to remarks such as have been tossed our way today after a little too big an evening last night. The latest crack was, "Hello, dwarf", which didn't seem to make sense and we said as much. "Makes sense to us", we were told, "you certainly look Sleepy and Dopey".

SHRDLU

Steel Co., St. Louis

400 tons, ramp connecti... 149, Brooklyn, N. Y. Bridge Works, Pittsbu... gineering Co., New York tractor.

400 tons, municipal ... Grand Fork, N. D., to ... Moines Steel Co., Pitts...

380 tons, addition to p... court house, Los Ange... dated Steel Corp., Los A...

370 tons, garage and o... Newark, N. J., for sta... Structural Steel Co., A...

370 tons, laboratory, bur... ards, Washington, to Fe... Works, Pittsburgh.

325 tons, overhead cross... Pacific lines, Berkeley, C... to Moore Dry Dock Co., S...

305 tons, boiler house, Kin... Wis., to Lakeside Bridge... Milwaukee.

300 tons, state bridge o... river, Kremmling, Colo. Bridge Co., Pittsburgh.

240 tons, building additions, ... airport, Queens, N. Y.. Steel Co., Bethlehem, Pa.; ... curement division, trea... ment, New York.

235 tons, state bridge ov... river, Norwich, Conn.. ... Steel Co., Bethlehem, Pa...

225 tons, shop and ware... department, Honolulu, T... named interest.

222 tons, highway bridge, Br... Central Texas Iron Works...

215 tons, St. Louis & San Fr... road bridge, Moselle, Ill... Bros. Bridge & Iron Co., ...

210 tons, contract SC-39-6, ... Queens, N. Y., to American... Pittsburgh.

200 tons, tunnel construct... wood avenue, Chicago, ... Bridge Co., Chicago.

175 tons, central school, C... to Reecon Co., Buffalo.

156 tons, state span Renton... Pacific Car & Foundry Co...

155 tons, bridge, FAGM 60... Louis, to Mississippi Valley... Steel Co., St. Louis.

150 tons, shop building, for... Brandt Inc., Baltimore, t... Steel Products Co., Baltim...

150 tons, six oil derricks, fo... eral Petroleum Corp., one... wood Oil Corp. and one... Petroleum Corp., Long Be... to unnamed interests.

135 tons, boiler house ext... Tide Water Associated Oil C... N. J., to Savary & Glaesse...

135 tons, viaduct over Missi... railroad, Murray, Nebr., fo... Illinois Steel Bridge Co., J... Ill.

115 tons, bureau of reclamati... trusses, spec. 832, Washingt... sissippi Valley Structural ... St. Louis.

110 tons, Pennsylvania turnpi... set county, Pennsylvania... Pitt Bridge Works, Pittsbu...

105 tons, factory building, S... Mich., to Joseph T. Ryerso... Co. Inc., Chicago.

105 tons, factory building, A... to Hansell Elcock Co., Chic...

Shape Contracts Pend...

15,000 tons, superstructure ... over Susquehanna river.

uperstructure of bridge
c river, Ludlow Ferry,
, Va., for state of Mary-

amento river and Doney
Central Valley project,
nerican Bridge Co., Pitts-
$294,060.

erstructure, Erie avenue
n, O.; bids May 24.

mot street bridge, Pitts-

g, Cuyahoga river bridge,
ut No. 6A, contract No.

ngs, for American Smelt-
g Co., San Francisco.

ments, for Chelsea Hous-
lantic City, N. J.

nt house, New York, for
entral railroad.

nmodore Perry housing
alo, John W. Cowper Co.,

ge 36, Brighton, O., for
Ohio railway.

sville, Mo., upper guard
and dam No. 24, Missis-
bids May 9.

dings, contract 19, Long
N. Y., for New York city
rity.

bridge 314, Eureka, Wis.

building, for Eddy Paper
owoc, Wis.

es, Lawrence, Mass.

ge over Maumee river,
or New York Central rail-

bridge, Tillamook county,
obsen-Jensen, 517 N. E.
tland, Oreg. low.

ing plant, Beltsville, Md.,
tates department of agri-

ool building, Rensselaer,

and storage building, for
t Co., Groton, N. Y.

ee bridges, one each in
ford, and Center counties,
for the Pennsylvania
tment of Highways, bids

ling, for Beatrice B. Berle,

n hatchery, specification
avenworth, Wash.; bids

ding, Federal Department
re, Beltsville, Md.; Bel-
Works, Eddystone, Pa., low.

terminal, for Green Bus
South Jamaica, N. Y.

e bridge over Kalamazoo
lock, Mich.

rpass, Central Valley proj-
nia, specification 1209-D;
Steel Co., San Francisco,

e bridge 1774, Alboite, Ind.
ding, for F. W. Woolworth
ntic, Conn.

tral heating plant, Storrs,
ate.

e bridge 570, Gays Mills,

erations to buildings, for
; Realty Corp., Brooklyn,

o I-beam bridges, Berks
nsylvania; bids to state
partment, Harrisburg, Pa.,

dernizing cell block and
new equipment McNeil
son, Wash.; bids May 16.

apes, castings and steel
hatchery Leavenworth,

Wash.; bids to Denver, May 2; Specs. 1218-D and 1219-D.

Reinforcing

Reinforcing Bar Prices, Page 83

Pittsburgh—Little change is noted in volume of awards. There is still a substantial tonnage awaiting placement. Largest inquiry calls for 1400 tons for the Kittatinny-Blue Mountain tunnel, KB-2, Franklin county, Pennsylvania.

Chicago — New demand for reinforcing bars remains one of the more encouraging factors in the current outlook. Warmer weather has brought more closings, and also resulted in a further upturn in inquiries.

Boston — Inquiry is confined to small lots which are somewhat more numerous, contracts aggregating approximately 600 tons including 150 tons, aircraft factory addition, Stratford, Conn.

New York—Contracts are on the

Coil Conveyor
FOR 48" WIDE STRIP MILL

by LINK-BELT

● Here is a section of a 1008-ft. long Link-Belt conveyor which handles coils of hot strip steel weighing 6,000 to 12,600 lbs. each, from the hot strip mill to the cold reduction department of this new tin plate mill.

Enroute on the conveyor, the coils are automatically weighed and cooled. The conveyor medium consists of a double-strand of Link-Belt steel-bar-link anti-friction rolling chain.

Link-Belt—builders of chains, conveyors and power transmission equipment since 1875—has perfected an extensive line of chains for transfer tables, coil conveyors, furnace conveyors, feeder and catcher tables, sheet pilers, draw bench and other equipment, as well as complete line of chains for every power transmission service. Let a Link-Belt chain specialist recommend the best chain for your purpose.

LINK-BELT COMPANY

Chicago Pittsburgh Indianapolis Philadelphia Cleveland Detroit

Offices in Principal Cities

1673A

decline with new requirements coming out slowly, 1750 tons for additional sections, Circumferential highway, Queens, N. Y., being outstanding. The New York state highway program continues to lag while bridge and engineering needs are light.

Philadelphia — Several fair size jobs are up for figures this week, including two sections of the "all-weather" highway between Harrisburg and Pittsburgh. McCloskey & Co., general contractors, this city, have placed 250 tons of rail steel bars for an addition to the Nazareth hospital here.

Seattle — While new projects are developing slowly, several sizable contracts are pending. Bethlehem Steel Co., Seattle, is rolling between 6000 and 7000 tons for Coulee dam.

San Francisco — Awards were largest in over seven weeks and aggregated 5400 tons, bringing the total to date to 66,018 tons compared with 34,462 tons in 1938. The bureau of reclamation placed over 2800 tons for delivery at several points in Washington, with Bethlehem Steel Co. and 354 tons for delivery at Kremling, Colo. and Cody, Wyo., with Colorado Fuel & Iron Co.

Reinforcing Steel Awards

10,000 tons, Social Security and Railroad Retirement building, Washington, to Sweets Steel Co., Philadelphia; through McClosky & Co., Philadelphia.

2250 tons, housing project, New Orleans, to Henry Ericsson Co., Chicago.

1550 tons, New York approach northerly portion Harlem river ... Washington bridge ... bridge park, to Joser... Son Co. Inc., Chicago ... eastern Construction ...

589 tons, bureau of rec... tions A-33,862-A als... 842A, Buena, Wash. ... Steel Co., Seattle.

500 tons, addition to pos... house, Los Angeles, ... Steel Corp., Los Angel...

438 tons, bars and mesh ... Hough street, Los An... to unnamed interest. ...

350 tons, six-story ... Bakersfield, Calif., to ... est.

250 tons, bureau of recl... tion 46,033-A, Kremlin... rado Fuel & Iron Co., ...

250 tons, addition, Na... Philadelphia, through ... Co., general contractor ... the Sweets Steel Co., W...

220 tons, state bridge Ti... Oregon, to unstated P... Jacobsen-Jensen Co., P... contractors.

200 tons, 122nd field ar... Chicago, to unnamed i...

200 tons, school buildi... Calif., to unnamed in...

160 tons, school, Clyde, N... Co., Buffalo.

150 tons, building, state ... bureau, Harrisburg, P... Steel Co., Williamspor... McCloskey & Co., Phi...

150 tons, factory, Unite... Stratford, Conn., to Tru... Youngstown, O.

140 tons, assembly hall f... Sacramento, Calif., to ... Iron Works, Sacramento

140 tons, elementary sch... Iowa, to Republic Steel ... land.

135 tons, dormitory, Sout... to Republic Steel Corp...

134 tons, bureau of reclam... tion 48,188-A, Cody, Wyo... Fuel & Iron Co., Pueblo, ...

132 tons, highway work ... Alameda county, Califor... to San Jose Steel Co., S...

132 tons, section 8-B2, ... turnpike commission, Sor... Pennsylvania, to Trusc... Youngstown, O.

130 tons, school, North ... to Truscon Steel Co., Y...

Concrete Bars Com...

Week ended April 29	...
Week ended April 22	...
Week ended April 15	...
This week, 1938	...
Weekly average, year	...
Weekly average, 1939	...
Weekly average, March	...
Total to date, 1938	...
Total to date, 1939	...

Includes awards of 100 to...

R/P PAGE HI-TENSILE "G" for these best of Reasons

● **TOUGH, DUCTILE WELDS** . . Hi-Tensile "**G**" produces strong joints that withstand shock and strain. Tests on Hi-Tensile "**G**" welds show surprising elongation.

● **HIGH SPEED AT ALL CURRENT VALUES** . . Welders say that Hi-Tensile "**G**" can "stand the heat" better than any rod they've ever used—and that it's the "coldest-running" rod.

● **SMOOTHNESS OF BEAD** . . We know of no rod that runs more smoothly and leaves a smoother bead. Very little spatter.

● **ADAPTABILITY** . . This rod is practical for use under all conditions on production, maintenance and construction work.

BUY ACCO QUALITY *in Page Welding Electrodes, Page Chain Link Fence, Tru-Lay Preformed Wire Rope, Reading-Pratt & Cady Valves, Campbell Abrasive Cutting Machines, American Chains (Welded and Weldless) and Wright Hoists.*

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MONESSEN, PENNSYLVANIA

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nen's dormitory, Madison, uscon Steel Co., Youngs-

age disposal plant, Bryan ak Steel Co., Cincinnati; on, Cleveland, contractor.

au of reclamation, invita- A, Cody, Wyo., to Bethle- o., Bethlehem, Pa.

Valley dam, Los Angeles, interest; through general J. F. Shea Co., 617 South Los Angeles.

urnalist building, Minne- ethlehem Steel Co., Beth-

ig Steel Pending

icago subway section; bids

age disposal plants, Gary, nent Construction Co., Chi-

ditional sections, Circum- ghway, Queens, N. Y.

tatinny-Blue mountain tun- Franklin county, Pennsyl-

au of reclamation, Central ect, California; bids May 2.

y barracks, Chanute field, ppman Construction Co., w.

a Creek dam, Bethlehem,

asury department, Los An- ation A-9153, list 304; bids

legheny mountain tunnel, ounty, Pennsylvania.

eau of reclamation, invita- 3,868-A and A-28,846-A, sh.; bids opened.

edule 3445, Panama Canal, opened.

sing, Eighty-seventh street e Grove avenue, Chicago.

mated, $3,000,000 Glenwood roject, Philadelphia; bids

sewage treatment plant, Mass.

oposed Mark Twain hotel, is in to Roosevelt Building ral contractor.

age treatment plant, Spring-

mmodore Perry housing proj- lo; John W. Cowper Co., w.

ederal building Anchorage, is in at Washington.

aint shop and transformer specification 8994, Mare d.; navy yard; bids May 10.

ings River bridge, Tulare lifornia; bids May 10.

ion 13-B, Pennsylvania turn- mission, Bedford county, nia.

ater filtration plant, Paw- I.

using project, 25 buildings, nd.

nsane hospital, Sheboygan, April 28.

ntral Nebraska power and group 32-G, Hastings, Nebr.

aste treatment plant, Stand- s, Pekin, Ill.

hicago Board of Education, vocational school, rebidding y postponed.

160 tons, highway work, Arapahoe county, Colorado; bids opened.

140 tons, sewage plant, Manitowoc, Wis.

110 tons, viaduct, Providence, R. I.; Coleman Bros. Corp., Boston, general contractor.

100 tons, Clarksville, Mo., upper guard wall for lock and dam No. 24, Mississippi river; bids May 9.

Unstated, 19,950 pieces, for Roza project, Washington state; bids in at Denver, April 24.

Unstated, state bridges Yellowstone county and St. Regis river, Montana; bids in April 28.

Unstated, state bridge, Wallace, Idaho; Sam Orino, Spokane, general contractor.

Unstated, addition to Yakima, Wash., postoffice; Evind Anderson, Tacoma, general contractor.

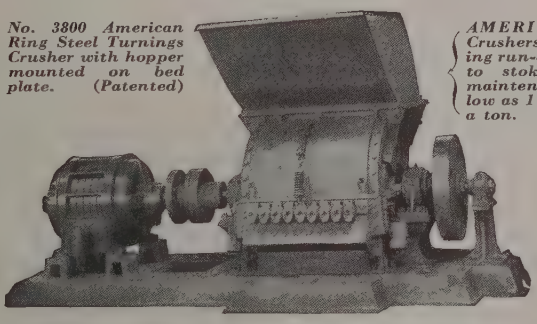
Unstated tonnage, agricultural building, Peoria, Ill.

Pig Iron

Pig Iron Prices, Page 84

Pittsburgh—Movement of pig iron to manufacturing foundries shows little change, although radiator plants are somewhat busier. One

No. 3800 American Ring Steel Turnings Crusher with hopper mounted on bed plate. (Patented)



AMERICAN Ring Crushers are crushing run-of-mine coal to stoker size at maintenance costs as low as 1/10 of a cent a ton.

EXTRA PROFITS by crushing your turnings!

Many shops and manufacturing plants are making extra profits by crushing their turnings into chips with American Ring Steel Turning Crushers. Chips not only bring a higher price, but they are easy to handle, require less storage space and are easier to ship.

Your long turnings will cease to be a nuisance after you put an American Ring Crusher on the job. It will pay for itself in a very short time, after which it will pay you a large weekly profit.

Do you want this extra profit?

ORIGINATORS OF THE ROLLING RING CRUSHER PRINCIPLE

AMERICAN PULVERIZER CO.
1539 MACKLIND AVE. — ST. LOUIS

company is preparing to open another plant shortly. Blast furnace operations have been hampered by the coal strike, but in some cases shutdowns have been caused by lack of demand as well as a desire to conserve fuel.

Cleveland—Shipments lately have declined more rapidly, indicating a reduction of 15 to 20 per cent in April deliveries compared with March. Foundry operations are tending downward, although some melters, including heating equipment interests, are maintaining schedules. Demand for automotive parts is receding, but a few foundries specializing in such work continue busy. Jobbing plants are without sufficient backlogs to permit arranging schedules more than a few days ahead.

Chicago—Shipments during April were close to 15 per cent below March. Foundry melt changed little in April, leading sellers to believe decreased shipping orders resulted mostly from reduction of inventories and not from dwindling business. Sales are spotty, most consumers being well covered. Shipments of by-product [illegible] reflecting more direct[ly] foundry operations, [es]tially unchanged from

New York — Pig i[ron] and orders are tendi[ng] Manufacturers of b[ut]ware and machinery a[re] fying fairly well, but casting requirements [are] ly small to bring dow[n] melt. Pig iron sellers early improvement.

Philadelphia—The st[eel] ing melt has tapered offsetting the improve[ment] March, in the experie[nce] producers. This is be[ing] in both orders and shi[p]sellers seeing little ahead.

Buffalo — Shipmen[ts] changed, but pig iro[n] has been curtailed. Ha[rt] Corp. has banked one furnaces as a "precauti[on]ure" to conserve fuel. H[e] viously had been suffic[ient] vent excessive piling o[f] cating some working off the near future.

Cincinnati—April shi[p]smaller than those of letdown being small widely, with the excep[tion] mand from producers tool castings.

St. Louis—Deliveries slacken, the April move[ment] estimated at 10 to 15 p[er] hind March although wel[l a] tonnage a year ago. C[oke] also is declining, althoug[h at] tively slower rate. Stove generally are more active tions are below expectat[ions] bing plant schedules va[ry] Fears of a shortage have coke production and [ship] Coal mines in nearby d[is]busier as a result of t[he] suspension.

Birmingham, Ala.—Pig [iron] duction has been off so[me] recent weeks, and there dence thus far of an early ment.

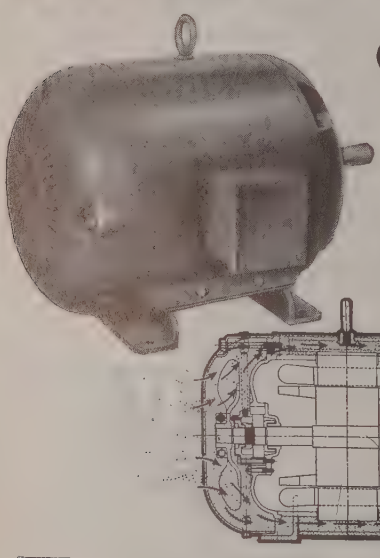
Toronto, Ont. — Pig iro[n] is spotty, with the we[ek] slightly above 1200 tons. for spot delivery, with for tracting inactive. Steelw busy, but foundries find provement in new orders demand is for small lots.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, P[ig]

Bolt and nut buying sh[ows] improvement despite bet[ter] ment lately, and April busi off from March. Railroad

Motor Protection Costs Less Than Motor Maintenance



WHERE DUST AND STEEL PARTICLES ARE PRESENT

A FEW OF THE MANY OUTSTANDING FEATURES OF WAGNER TYPE CP TOTALLY-ENCLOSED FAN-COOLED MOTORS

- Rugged, welded all-steel stator with specially impregnated windings.
- Dynamically-balanced cast rotor, equipped with sturdy shaft having end-milled keyways. Full-cartridge bearings completely sealed for protection.
- Easily accessible grease plugs on both ends of motor, permitting lubrication while running.

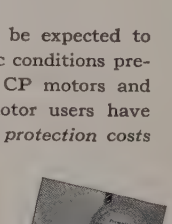
Abrasive dust is destructive to open type motors, but harmless where Wagner CP totally-enclosed, fan-cooled motors are installed. The Wagner CP motor has two frames, an outer frame which guides a strong cooling draft over the motor and an inner frame which completely seals the vital parts of the motor against the entrance of dust, filings, fumes, moisture, and other destructive agents.

Open type motors should not be expected to operate where such atmospheric conditions prevail. Standardize on Wagner CP motors and you will discover as other motor users have already discovered that *motor protection costs less than motor maintenance.*

WRITE FOR BULLETIN 182

A 70-page bulletin completely describing Wagner type CP totally-enclosed, fan-cooled motors and other types of polyphase motors will be sent upon request. You should have a copy.

M39-10



Wagner Electric Corporation

6400 Plymouth Avenue, Saint Louis, Mo., U.S.A.

MOTORS TRANSFORMERS FANS BRAKES

tions continue relatively light though substantially better than a year ago. Shipyard releases momentarily are quiet, but the outlook is encouraging in view of the number of naval and private ships coming up for bids within a few weeks Activity in machine tool building is aiding cap screw demand.

Scrap

Scrap Prices, Page 86

Pittsburgh—No. 1 heavy melting steel is down 50 cents a ton on offers of this grade to mills at $15, although as yet not confirmed by sales. Other open-hearth grades also are lower, with No. 2 steel $14. Low phos material and railroad specialties are unchanged despite quiet demand. Supplies of No. 1 steel available at $15 are heavier than those offered at $16 a month ago.

Cleveland—Little scrap is moving, mostly to outside consuming points. Business here and in the Youngstown district is practically at a standstill. Quotations here are weak, with malleable grades off 50 cents. Youngstown prices are down 25 cents on most grades.

Chicago—Activity in scrap is confined largely to covering of recent mill purchases. Prices are unchanged. Country scrap is coming out more freely. With consumption declining little additional consumer buying is in early prospect.

Boston—The market is dull, most demand being coverage of old export orders, with foundry grades slow. Heavy breakable cast is slightly easier. One dealer continues to pay $13.75 for No. 1 steel for export and is getting tonnage at that price.

New York—Demand is inactive, eastern mills taking small shipments against old orders but placing little new business. A similar situation applies to foundries taking cast grades. Machinery cast and rerolling rails are off 50 cents, while stove plate for export is down to $9. Other export prices are unchangd.

Philadelphia — Heavy breakable cast is slightly more active, with some buying at $14.75, down 25 cents from the recent market. Machine shop turnings are nominally 50 cents lower. Domestic demand for heavy melting steel is at a standstill, with prices weak but unchanged.

Buffalo—About 5000 tons of No. 2 heavy melting steel has been sold at Syracuse for export. The scrap will move via the barge canal to Albany, N. Y. on its way to the

THE HEART
in the heart . . .
CLEVELAND

is the only taxi you need
come to Cleveland—
otel Cleveland adjoins the
minal. And here you're
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erything you want to see.

enience is only one of
sons you'll like Hotel
Food we believe un-
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estaurants. Friendliness
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as your own at home.
oms to match your mood
ke quiet, restful concert
gay dancing.

der that Clevelanders pre-
leveland, and experienced
warmly agree with them.

EL
EVELAND
Cleveland

USE
MOORE RAPID
Lectromelt
FURNACES
for
MELTING
REFINING
SMELTING

Alloy and Carbon Steels.
Gray and Malleable Irons.
Copper, Nickel and Alloys.
Ferro-Alloys, Carbide.
Special Products.

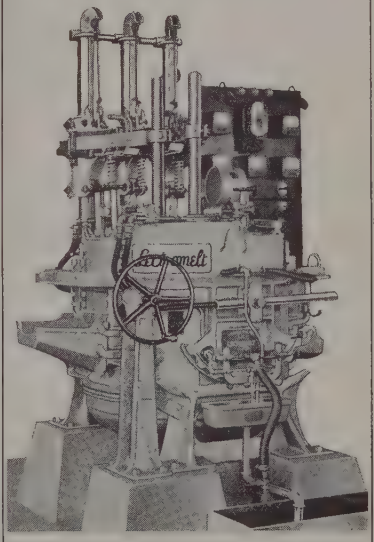


Illustration shows a 500 pound capacity 3 phase direct arc LECTROMELT furnace installed in jobbing steel foundry.

RAPID
ECONOMICAL
RUGGED

BUILT IN STANDARD SIZES
25 LBS. TO 50 TONS CAPACITY

PITTSBURGH
LECTROMELT
FURNACE
CORP.
PITTSBURGH, PA.

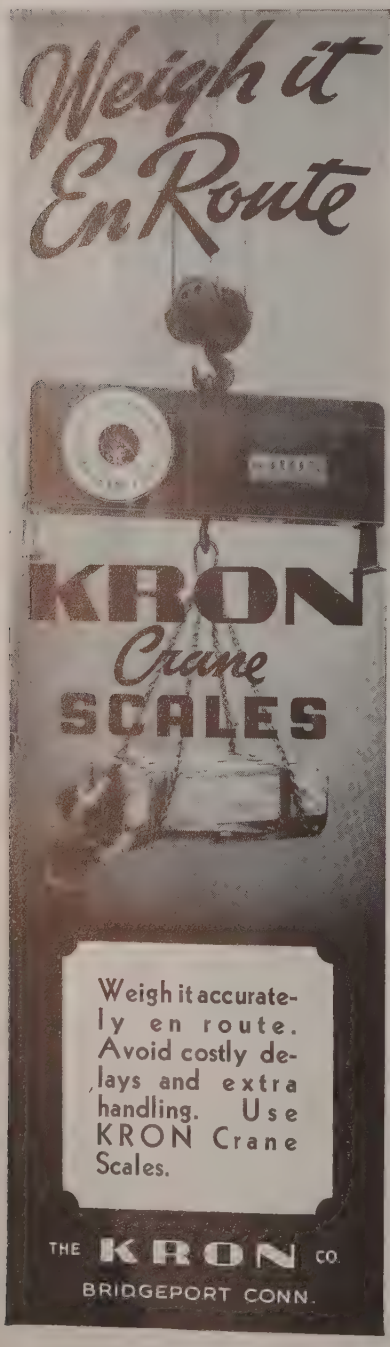
coast. Price paid was $11.25, equivalent to $13.88, delivered, Buffalo. This purchase and a few small sales of No. 1 steel to a local mill at slightly above the prevailing range of $13.50 to $14 give a better tone to the market. The first boatload of scrap reaching here this season docked recently with 2675 tons of turnings and borings.

Cincinnati—Another reduction of 25 cents in dealers' buying prices reflects market dullness. Recent railroad lists brought lower bids and some offerings were withdrawn because of unsatisfactory prices.

Detroit—Scrap continues inactive, with prices weaker, if anything. It is difficult to determine quotations accurately in the face of prolonged absence of consumer buying.

St. Louis—Heavy melting steel is unchanged on a mill purchase of 7000 to 8000 tons of No. 1 and No. 2, the former bringing $12.50. However, this represents an appreciable reduction from the last purchase.

Seattle—The export market continues firm at about $14.50 for No. 1 despite lack of new business from the Orient. Commitments are about cleaned up and the movement is expected to be small the next 60 days.



Warehouse

Warehouse Prices, Page 85

St. Louis—Warehouse trade continues dull. Oil country supplies make the best showing, with farm goods slow and railroad orders confined largely to shop materials.

Cincinnati—April sales held near the March rate. Orders show occasional gains in numbers but are smaller individually. Activity in building materials is slow to increase.

Philadelphia—Jobbers report a substantial reduction in April bookings. In some cases volume is off 15 to 20 per cent, and momentarily at least resellers contemplate no early improvement. Prices generally are unchanged.

Buffalo—Sales are slightly heavier, but changes the past few weeks have been insufficient to indicate a definite upward trend. Heavy products continue slow.

Detroit—Demand is spotty, varying sharply from day to day. Large tool and die programs are being figured by the automotive industry, but some of this business may be placed out of town.

Chicago—Business has been well sustained despite the usual month-end tapering, and in point of number of orders April is expected to compare favorably with any month since October, 1937.

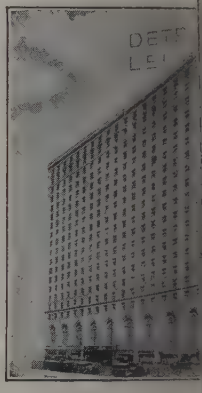
Bar Iron Rates Steady

■ Monthly examination of sales sheets by representatives of Western Bar Iron association and Amalgamated Association of Iron, Steel and Tin Workers, developed a card rate of 2.25c on boiling, bar and 12-inch mills and 2.35c on guide and 10-inch, for May. This entitles puddlers to $13.05 a ton. These rates have been in effect since last July.

Steel in Eu

Foreign Steel Price

London—(*By Cable*) iron and steelworks o are expanding to n fense and normal co mand. An additional has been lighted in brough district. St working close to cap ports of ingot and sem are increasing, to sup ficient domestic prod mills are working ful



OUR AIM is to service. A litt complete... mo pitable... more ... than even th exacting guest

CHAS. H. LO
Manager

Every Room Cu with Private
Single from
Double from

DETRO
LELAN
HOTE

CASS AT BAGLE GARAGE IN CONN

ships placed since April
than 500,000 tons.

ent reports exports im-
l markets, British or-
eatly increased. Price
re disappearing except
rican and Australian

re

e Prices, Page 86

-Iron ore shippers are
ale down previous esti-
e probable movement
nes this season. Ex-
or to the recent unfav-
in business were for
f 40,000,000 to 50,000,-
e-blocked passages at
esulting in a late start
on. but a number of
ected to be under way
ore inquiries continue
reflecting uncertainty
ers' requirements the
onths.

nland Steel Co.'s ore
ared for Lake Superior
apparently will again
of the season through
of the boats, the L. E.
ip of the Inland fleet,
carrying record for a
nt from Lake Superior,
ging down 15,726 tons.
53,497 tons of iron ore
the Lake Superior dis-
68.5 per cent was low
nonbessemer; 4.7 per
osphorus nonbessemer;
t bessemer; 3.3 man-
nd 1.7 silicious, accord-
ake Superior Iron Ore
The total tonnage av-
per cent iron natural;
orus; 8.25 silica; 0.81
nd 10.13 moisture. The
nd analyses have been
nt for a number of

s Metals

ous Prices, Page 102

— A surprise move
e of the leading mine
withdrawing from the
et by advancing its quo-
50c stimulated demand
hich in turn firmed the
e 10.25-cent level. Tin
ced to new highs since
ead developed a strong

Sales last week exceed-
month's total since last
were estimated at
0 tons. The fact that
not sustained after the
was disappointing to

the trade since it is known that consumers' stocks are still low. Custom smelters and resellers advanced electrolytic prices to 10.25c on Wednesday while brass and bronze ingot and red metal scrap prices rose proportionately.

Tin — Consumers bought actively as a protection against possible interruption of shipments in case of European hostilities. Both London and New York markets advanced to the highest levels since 1937 with Straits spot selling up to 48.87½c, the close.

Lead — Average weekly lead sales of 10,000 tons and monthly shipments of 40,000 tons are eminently satisfactory and have strengthened prices at 4.60c, East St. Louis.

Zinc — Continued low prices in London again depressed the domestic market and prime western was unable to rise from the 4.50-cent level.

TORONTO **ACID BRICK**
Impervious

to any Acid Action

■ Repressed Toronto Acid Brick, accurately molded in stock or special shapes, are completely DEAERATED, and as a result are ACID PROOF. It is THE brick to use with basolit, the acid proof cement joint, to make tank walls and floors impervious to any acid action. Toronto Acid Brick are laid at lower labor cost, because of their shape. Requests for additional information will be courteously fulfilled.

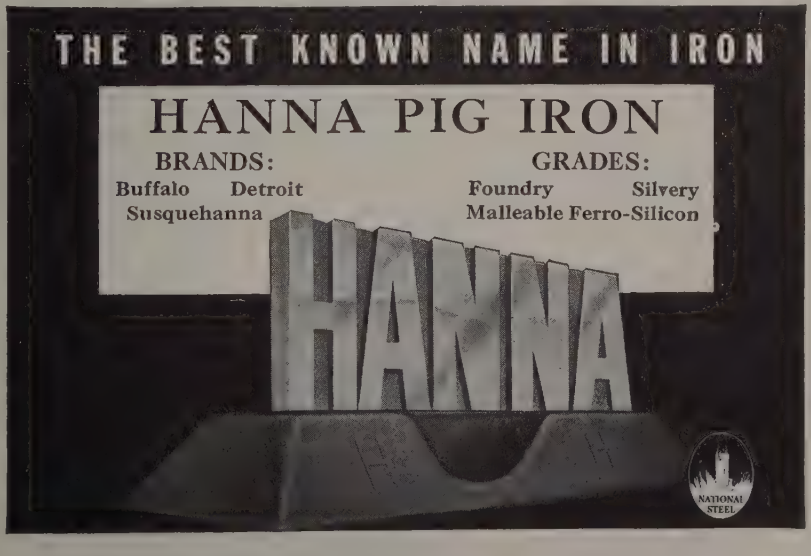
THE KEAGLER BRICK CO.
Steubenville, Ohio (Pittsburgh District)

THE BEST KNOWN NAME IN IRON

HANNA PIG IRON

BRANDS: Buffalo Detroit Susquehanna

GRADES: Foundry Silvery Malleable Ferro-Silicon



THE HANNA FURNACE CORPORATION
MERCHANT PIG IRON DIVISION OF NATIONAL STEEL CORPORATION
Buffalo Detroit New York Philadelphia Boston

Construction and Enterprise

Ohio

CLEVELAND—City, division of light and power, is taking bids due at noon, May 5, on quantities of several types of power transformers (Order No. 425-39).

CLEVELAND—Willard Storage Battery Co. is making plans for a two-story, 40 x 300-foot factory addition costing about $125,000. P. J. Voth, Cleveland, engineer.

CLEVELAND—Tinnerman Stove & Range Co., A. H. Tinnerman, president, has awarded contract for a 50 x 100-foot factory unit estimated to cost $40,000, to Austin Co., Cleveland.

GALLIPOLIS, O.—Buckeye Rural Electric association, O. E. Elliott, president, is working on drawings a for bids about May 10 or electric power transmiss of $154,000. Putnam & ton, O., consulting en April 3.)

MASSILLON, O.—City service director, is consi ation for survey for a plant. C. E. Rice, city

MEDINA, O.—Village, tees, W. F. Fenton, clerk, advertise for bids on or and high service centrif service water pump an not to exceed $10,000.

PORT CLINTON, O. Slauterbeck, mayor, will completed about June sanitary sewerage syste disposal plant. Seeking Consultants, Champe, Associates, Toledo, O. (N

SILVER LAKE, O.—C mayor, has plans in prog age disposal system inv station, connecting sewers equipment. Consulting e Barstow, Akron, O.

SOUTH WEBSTER, O. Cole, mayor, is drawing making preliminary plans its waterworks and se plant. Henry K. Martin, consulting engineer.

STEUBENVILLE, O.— Boyd, service director, plans and soon will rece tracts 8, 9 and 10, involv sewage pumping station. gineer, H. P. Jones & (Noted Feb. 13.)

TOLEDO, O.—City, wa completing plans and wil bids early in May on Co lake water system cos Includes intake crib, con ley & Hansen, Chicago,

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound.

April	Electro, del. Conn.	Copper Lake, del. Midwest	Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
22	10.00	10.25	9.62½	48.12½	47.80	4.75	4.60	4.50	20.00	11.50	35.00
24	10.00	10.25	9.62½	48.20	47.85	4.75	4.60	4.50	20.00	11.50	35.00
25	10.00	10.25	9.62½	48.25	47.95	4.75	4.60	4.50	20.00	11.50	35.00
26	10.25	10.25	9.87½	48.45	48.00	4.75	4.60	4.50	20.00	11.50	35.00
27	10.25	10.25	9.87½	48.65	48.12½	4.75	4.60	4.50	20.00	11.50	35.00
28	10.25	10.25	9.87½	48.87½	48.40	4.75	4.60	4.50	20.00	11.50	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb, except as specified. Copper brass products based on 10.25c Conn. copper

Sheets

Yellow brass (high) 16.65
Copper, hot rolled 18.37
Lead, cut to jobbers 8.00
Zinc, 100 lb. base 9.75

Tubes

High yellow brass 19.40
Seamless copper 18.87

Rods

High yellow brass 12.00
Copper, hot rolled 14.87

Anodes

Copper, untrimmed 15.62

Wire

Yellow brass (high) 16.90

OLD METALS

Nom. Del. Buying Prices

No. 1 Composition Red Brass

New York 6.00-6.25
Cleveland 6.12½-6.37½
Chicago 6.25-6.50
St. Louis 6.00-6.25

Heavy Copper and Wire

New York, No. 1 ..... 8.00-8.12½
Cleveland, No. 1 ..... 7.62½-7.75
Chicago, No. 1 ..... 7.62½-7.87½
St. Louis 7.50-7.75

Composition Brass Borings

New York 5.25-5.50

Light Copper

New York 6.50-6.75
Cleveland 5.87½-6.00
Chicago 6.25-6.50
St. Louis 6.00-6.25

Light Brass

Cleveland 3.12½-3.37½
Chicago 4.00-4.25
St. Louis 3.50-3.75

Lead

New York 4.10-4.35
Cleveland 3.50-3.75
Chicago 3.50-3.75
St. Louis 3.50-3.75

Zinc

New York 2.50-2.62½
Cleveland 2.00-2.25
St. Louis 2.00-2.25

Aluminum

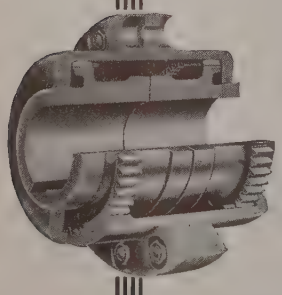
Borings, Cleveland 6.25-6.50
Mixed, cast, Cleveland 7.75-8.00
Clips, soft, Cleveland 14.75-15.00
Misc. cast, St. Louis 7.00-7.25

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads..10.50
Standard No. 12 aluminum....12.50-13.00

POOLE

FLEXIBLE COUPLINGS



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NO WELDED PARTS
OIL TIGHT • FREE END FLOAT
DUST PROOF • FULLY LUBRICATED

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Flexible Coupling Handbook

POOLE FOUNDRY & MACHINE CO.
Baltimore, Md.

Rhode Island

PROVIDENCE, R. I.—B Mfg. Co. is building a 177-foot factory addition. ing its present plant, at cost of $40,000.

New York

BINGHAMTON, N. Y.— for purchasing a 125-kil ing unit costing $25,000 in the new hospital. J. A. engineer.

BUFFALO—General Mil apolis, proposes to cons addition costing approxi 000. Project will mature

CELERON, N. Y.—Mu take bids during this yea disposal plant and sewers cost $108,000. William S Rochester, N. Y., engineer.

NIAGARA FALLS, N. Y. Coal & Coke Co., Chicago, contracts for a carbon more than $40,000.

New Jersey

EDGEWATER, N. J. — Cambridge, Mass., has awa for constructing and equi costing $1,000,000 to Stor Inc., New York. (Noted A

TRENTON, N. J.—Hamil commission will soon rec Contract 3, involving sew pumping stations, in its $4 disposal project. Kelly & A Trenton, consulting engine

Pennsylvania

SOMERSET, PA.—Somers tric co-operative takes bid June 15 for 300 miles

at cost of about $300,000.

—Chicago Metallic Mfg. Co. ids on a 65 x 100-foot factory sting about $40,000. A. Epago, architect.

WS, IND.—Town, J. Dunlap, ves bids on a 60,000-gallon tank, pipe, hydrants, valves, np, meters etc., costing total 30,000. O. T. Hancock, Plainconsultant.

, MD.—Julien P. Friez & Sons more, receives bids May 8 for on 18-acre site a laboratory sting about $500,000. Whitardt & Smith, Baltimore, conineers.

f Columbia

GTON—Department of inan Service, will contract for ting and power plant at ency, Ft. Defiance, Ariz., inlier units, stokers, controls, unit.

GTON—Navy department, bupplies and accounts, will take 10 a. m., May 5, on motorng machines (schedule 6161); ansformers (schedule 6060); etric motors (schedule 6116), e boilers (schedule 6122) and n engine lathes (schedule 16, pneumatic grinders (schedlectric drills (schedule 6140), oists (schedule 6168).

rolina

TON, N. C.—Town, B. Bristol, ives bids May 9 for materials ent for constructing outdoor station. Includes switches, breakers, current transformregulators etc.

E RAPIDS, N. C.—Halifax nc. proposes to install electric ment in addition to its kraft Total cost, about $75,000. ne & Co., Greenville, S. C.,

rolina

S, S. C.—Laurens County Rucation co-operative, C. B. Cantentative, proposes to construct f rural electric power lines. for REA allotment.

PLATTE, LA. — Continental nca City, Okla., plans to con- natural gasoline plant and desalting plant at cost of 000.

ginia

GTON, W. VA.—American l Co., Middletown, O., has acr site and will construct a and other loading equipment 0,000.

A, ARK. — Woodruff Electric e Corp. has $316,000 REA nd will build 355 miles rural es through seven counties.

, OKLA.—General Atlas Carmpa, Tex., F. M. Perry, com-

North Dakota

GRAFTON, N. DAK.—REA has allotted $229,000 to Walsh Rural Electric co-

authority, board of directors, room 806, Littlefield building, receives bids May 15 for furnishing one 125-ton overhead traveling crane to be installed in Marshall Ford powerhouse.

ELYSIAN FIELDS, TEX.—REA has allotted an additional $26,000 to Panola-Harrison Electric Co-operative Inc. for constructing 29 miles of rural power transmission lines. Previous allotments total $176,000.

Texas

AUSTIN, TEX.—Lower Colorado River

company engineer, will construct a carbon black gas plant costing an estimated $60,000.

Minnesota

GRAND RAPIDS, MINN.—United States Forest Service, regional purchasing agent, Milwaukee, takes bids to 2 p. m., May 15, on construction of a shop building, service building, sewage disposal system, mains and heating tunnel.

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1939
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SHEFFIELD STEELS
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FREE —a bulletin discussing important facts concerning tool steels, their use and processing. Just send your name today, and we'll see that you receive your bulletin promptly. No obligation, of course.

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Nebraska

HASTINGS, NEBR.—Central Nebraska Public Power and Irrigation district, R. O. Canaday, secretary, takes bids until 11 a. m., May 5, on the construction of power distribution substations. Certified check 5 per cent to accompany bids.

YORK, NEBR.—York County Rural Public Power district takes bids to May 11 on construction of 237 miles rural electric transmission lines in two counties. C. C. Cox, Amarillo, Tex., consulting engineer.

Iowa

DAYTON, IOWA—Village, George W. Tarrant, clerk, will soon take bids on furnishing testing equipment for its power plant. Ralph W. Gearhart, Cedar Rapids, Iowa, consultant.

DES MOINES, IOWA—State board of control, H. C. White, chairman, is taking separate bids until 2 p. m., May 5, on

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clerk, plans to construct
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for PWA funds. Ralph
Cedar Rapids, Iowa, consul

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$174,000 to the Southeast
operative Electric associa
Cornick, president, to financ
of 175 miles rural trans
serving 420 consumers.

POSTVILLE, IOWA—Allam
Electric co-operative is n
for constructing 206 miles
lines for which REA has all
A. W. Grubb, Vinton, Iow
engineer.

Colorado

DELTA, COLO.—REA h
$68,000 allotment to Delta-
ral Power Lines associati
construction of 84 miles
power transmission lines in

DENVER — Bureau of
asks bids until May 5 for
generator set, meter test
table for use at Boulde
plant (specification 1223-D
May 15 for two hydraulic
two oil pressure governors
835).

TRINIDAD, COLO.—T
Transmission Railway & G
allotted $39,000 by REA fo
31 miles of rural distributi

Idaho

LEWISTON, IDAHO—Clea
Light & Power association,
chief engineer, will call fo
60 days on various additi
its distribution system, am
miles of lines in all.

Pacific Coast

PORTLAND, OREG.—Cl
sen, architects, have compl
a proposed $25,000 constr
house, including hydraulic
frigeration and other equip

PORTLAND, OREG.—Ll
Roofing Co., Chicago, has a
tract to Dougan-Hammond
Co. for a 150 x 553-foot
total of about $200,000.

PORTLAND, OREG.—Bor
er administration, 811 North
street, is taking bids to Ma
tential transformers for p
tions.

Canada

SYDNEY, N. S.—Dominion
Corp., Montreal, will soon
for two open hearth furn
$1,000,000. H. L. Foell, en
of owner.

HAMILTON, ONT.—Nation
Corp., R. Hart, manager, w
contracts for a one-story, 7
machine shop costing $250,0
Souter, Hamilton, architects

PORT COLBORNE, ONT
tional Nickel Co. of Canad
ronto, will take bids w
months for reconstructing
plant at cost of $300,000.

TORONTO, ONT.—Falconb
Mines Ltd., J. G. Hardy, p
King street, plans to cons
finery costing more than $
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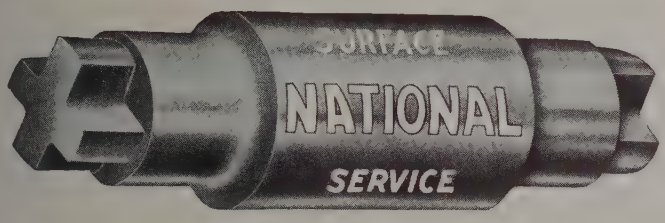

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Stewart Furnace Div., Chicago Flexible Shaft Co., 1106 So. Central Ave., Chicago, Ill.
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Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Continental Roll & Steel Fdry. Co., E. Chicago, Ind.
Damascus Steel Casting Co., New Brighton, Pa.
Ohio Steel Fdry. Co., Lima, O.
Pittsburgh Rolls Corp., 41st and Willow Sts., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell St., Chicago, Ill.
Union Steel Casting Co., 62nd and Butler Sts., Pittsburgh, Pa.
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Damascus Steel Casting Co., New Brighton, Pa.
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National-Erie Corp., Erie, Pa.
West Steel Casting Co., 805 E. 70th St., Cleveland, O.
Youngstown Alloy Casting Corp., 103 E. Indianola Ave., Youngstown, O.

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Bethlehem Steel Co., Bethlehem, Pa.
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Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Columbia Steel Co., San Francisco, Calif.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn. 344 Vulcan St., Buffalo, N. Y.
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National Roll & Foundry Co., The, Avonmore, Pa.
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Western Gas Div., The Koppers Co., Fort Wayne, Ind.

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National Alloy Steel Co., Blawnox, Pa.
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Lake City Malleable Co., 5026 Lakeside Ave., Cleveland, O.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis, Ind.
Peoria Malleable Castings Co., Peoria, Ill.

CASTINGS (Manganese Steel)
Damascus Steel Casting Co., New Brighton, Pa.

CASTINGS (Steel) (*Also Stainless)
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Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Continental Roll & Steel Fdry. Co., E. Chicago, Ind.
Damascus Steel Casting Co., New Brighton, Pa.
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Koppers Co., Western Gas Div., Fort Wayne, Ind.
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Oil Well Supply Co., Dallas, Texas.
Pittsburgh Rolls Corp., 41st and Willow Sts., Pittsburgh, Pa.
Standard Steel Works Co., Paschall P. O., Philadelphia, Pa.
Steel Founders' Society of America, 920 Midland Bldg., Cleveland, O.
Strong Steel Fdy. Co., Hertel & Norris Ave., Buffalo, N. Y.
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CHAIN (Roller)
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Link-Belt Co., 519 N. Holmes Ave., Indianapolis, Ind.

CHAIN (Sprocket)
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Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
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Koppers-Rheolaveur C Pittsburgh, Pa.
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Bartlett-Hayward Div., The Koppers Co., Baltimore, Md.
Clark Controller Co., The, 1146 E. 152nd St., Cleveland, O.
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General Electric Co., Schenectady, N. Y.
Hilliard Corp., The, 100 W. 4th St., Elmira, N. Y.
Horsburgh & Scott Co., The, 5114 Hamilton Ave., Cleveland, O.
James, D. O., Mfg. Co., 1114 W. Monroe St., Chicago, Ill.
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Waldron, John, Corp., New Brunswick, N. J.

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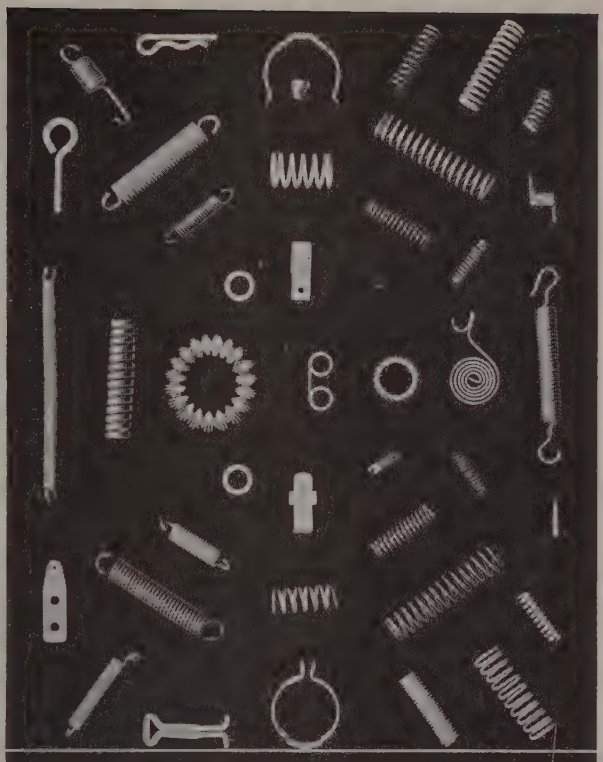
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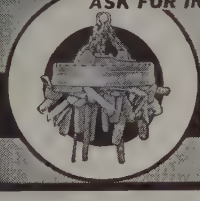
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Standard Steel Works Co., Paschall P. O., Philadelphia, Pa.

DIE CASTINGS
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Kinnear Mfg. Co., 818 Field Ave., Columbus, O.

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Wilputte Coke Oven Corp., 570 Lexington Ave., New York City.

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DRILL RODS—See RODS (Drill)

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DRILLS (Twist)—See TWIST DRILLS

DRIVES (Chain)
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Link-Belt Co., 519 N. Holmes Ave., Indianapolis, Ind.
Simonds Gear & Mfg. Co., The, 2501 Liberty St., Pittsburgh, Pa.

DRIVES (Cut Herringbone Gear)
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Foote Bros. Gear & Machine Corp., 5301 S. Western Ave., Chicago, Ill.
Horsburgh & Scott Co., The, 5114 Hamilton Ave., Cleveland, O.
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Mesta Machine Co., P. O. Box 1466, Pittsburgh, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.

DRIVES (Multi-V-Belt)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

DRIVES (Reciprocating)
Ajax Flexible Coupling Co., Westfield, N. Y.

DRUMS (Magnetic)
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Stearns Magnetic Mfg. Co., The, 650 So. 28th St., Milwaukee, Wis.

DRUMS (Steel)
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Pressed Steel Tank Co., Milwaukee, Wis.

DRYERS (Compressed Air)
Ruemelin Mfg. Co., 3860 N. Palmer St., Milwaukee, Wis.

DUST ARRESTING EQUIPMENT
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Research Corp., 405 Lexington Ave., New York City.
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Western Precipitation Corp., 1016 W. 9th St., Los Angeles, Calif.

ECONOMIC SERVICE
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ECONOMIZERS
Babcock & Wilcox Co., The, 19 Rector St., New York City.

ELECTRIC WELDING—See WELDING

ELECTRIC WIRING—See WIRE AND CABLE

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Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.
General Electric Co., Schenectady, N. Y.

ELEVATING AND CONVEYING MACHINERY—See CONVEYORS

ENGINEERS AND CONTRACTORS
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Brassert, H. A., & Co., 310 S. Michigan Ave., Chicago, Ill.
Hunt, C. H., 1213 First National Bank Bldg., Pittsburgh, Pa.
Morgan Engineering Co., The, Alliance, O.
Pennsylvania Industrial Engineers, 2413 W. Magnolia St., Pittsburgh, Pa.
Wean Engineering Co., Warren, O.
Wilputte Coke Oven Corp., 570 Lexington Ave., New York City.

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Brassert, H. A., & Co., 310 So. Michigan Ave., Chicago, Ill.
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FURNACE INSULATION—See INSULATION

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Hevi Duty Electric Co., 4100 W. Highland Blvd., Milwaukee, Wis.

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Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh, Pa.
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ng Co., The

m)
Co., The,

ngineering Co.,
Pa.
., Erie, Pa.
hoist Corp.,

ng Co., The,

Co., 3025 W. 47th
ll.
Inc., Front St. and
lladelphia, Pa.

t)
s Corp.,
d.
o.,
Conn.
Division,
s Corp.,
t,
Div., General
Bristol, Conn.
Corp.,
Drive, Chicago, Ill.
Inc., Front St. and
lladelphia, Pa.

ee Case

PECIALTIES
Mfg. Co.,
ttington Park Ave.,
a.
Castings Co.,

G MATERIALS
& Co., 240 W.
Philadelphia, Pa.

x Co., The,
New York City.

t)
Machinery Div.,
Pittsburgh, Pa.

ine Car)
& Cable Co.,
onn.

HINES
Co.,
t., Rockford, Ill.

o.,
., Rockford, Ill.

)
& Cable Co.,
onn.
ck Co., York, Pa
Mfg. Co.,
t., Philadelphia, Pa.

ic)
& Cable Co.,
onn.
eering Co.,
o Ave.,
Pa.

American MonoRail Co., The, 13107 Athens Ave., Cleveland, O.
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, O.
Ford Chain Block Co., York, Pa.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Industrial Brownhoist Corp., Bay City, Mich.
Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc., 406 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.

HOISTS (Monorail)
American Chain & Cable Co., Bridgeport, Conn.
American Engineering Co., 2484 Aramingo Ave., Philadelphia, Pa.
American MonoRail Co., The, 13107 Athens Ave., Cleveland, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc., 406 Broadway, Muskegon, Mich.
Shepard-Niles Crane & Hoist Corp., Montour Falls, N. Y.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.

HOISTS (Pneumatic)
Curtis Pneumatic Machinery Co., 1996 Kienlen Ave., St. Louis, Mo.
Ingersoll-Rand Co., 11 Broadway, New York City.

HOOKS (Chain)
American Chain & Cable Co., Bridgeport, Conn.

HOOPS AND BANDS
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell St., Chicago, Ill.
Stanley Works, The, New Britain, Conn. Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Youngstown Sheet & Tube Co., Youngstown, O.

HOSE (Flexible Metallic)
American Brass Co., The, American Metal Hose Branch, Waterbury, Conn.

HOSE (Rubber)
Goodyear Tire & Rubber Co., Akron, O.
United States Rubber Co., 1790 Broadway, New York City.

HYDRAULIC MACHINERY
Alliance Machine Co., The, Alliance, O.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Bethlehem Steel Co., Bethlehem, Pa.
Chambersburg Engineering Co., Chambersburg, Pa.
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn. 344 Vulcan St., Buffalo, N. Y.
Hannifin Mfg. Co., 621-631 So. Kolmar Ave., Chicago, Ill.
Lake Erie Engineering Corp., Kenmore Sta., Buffalo, N. Y.
Morgan Engineering Co., The, Alliance, O.
Wood, R. D., Co., 400 Chestnut St., Philadelphia, Pa.

HYDRAULIC PRESSES—See PRESSES (Hydraulic)

INDICATORS (Temperature)
American Gas Furnace Co., Elizabeth, N. J.
Brown Instrument Div. of Minneapolis Honeywell Regulator Co., 4462 Wayne Ave., Philadelphia, Pa.
Foxboro Co., The, 118 Neponset Ave., Foxboro, Mass.
Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.

INDICATORS (Blast Furnace Stock Line)
Broslus, Edgar E., Inc., Sharpsburg, Pa.

INGOT MOLDS
Bethlehem Steel Co., Bethlehem, Pa.
Shenango-Penn Mold Co., Oliver Bldg., Pittsburgh, Pa.
Valley Mould & Iron Co., Hubbard, O.

INGOT PIPE ELIMINATORS
Alpha-Lux Co., 192 Front St., New York City.

INHIBITORS
American Chemical Paint Co., Ambler, Pa.
Parkin, Wm. M., Co., The, 1005 Highland Bldg., Pittsburgh, Pa.

INSTRUMENTS (Electric Indicating and Recording)
Brown Instrument Div. of Minneapolis Honeywell Regulator Co., 4462 Wayne Ave., Philadelphia, Pa.
Foxboro Co., The, 118 Neponset Ave., Foxboro, Mass.
General Electric Co., Schenectady, N. Y.
Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.

INSULATING BLOCK
Armstrong Cork Products Co., Lancaster, Pa.
Johns-Manville Corp., 22 E. 40th St., New York City.

INSULATING BRICK
Armstrong Cork Products Co., Lancaster, Pa.
Johns-Manville Corp., 22 E. 40th St., New York City.

INSULATING POWDER AND CEMENT
Ajax Electrothermic Corp., Ajax Park, Trenton, N. J.
Armstrong Cork Products Co., Lancaster, Pa.
Babcock & Wilcox Co., The, 19 Rector St., New York City.

INSULATION (Furnace, Boiler Settings, Ovens, Steam Pipe, Etc.)
Armstrong Cork Products Co., Lancaster, Pa.
Johns-Manville Corp., 22 E. 40th St., New York City.

IRON (Bar)
Ryerson, Jos. T., & Son Co., 16th & Rockwell Sts., Chicago, Ill.

IRON (Ornamental)
Superior Iron & Wire Works, The, 39 Pride St., Pittsburgh, Pa.

IRON ORE
Alan Wood Steel Co., Conshohocken, Pa.
Cleveland-Cliffs Iron Co., Union Commerce Bldg., Cleveland, O.
Hanna Furnace Corp., The, Ecorse, Detroit, Mich.
Shenango Furnace Co., Oliver Bldg., Pittsburgh, Pa.
Snyder, W. P., & Co., Oliver Bldg., Pittsburgh, Pa.
Youngstown Sheet & Tube Co., The, Youngstown, O.

JIGS AND FIXTURES
Columbus Die, Tool & Mach. Co., 955 Cleveland Ave., Columbus, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.

KETTLES (Galvanizing)
Petroleum Iron Works Co., Sharon, Pa

KEYS (Machine)
Moltrup Steel Products Co., Beaver Falls, Pa.

KEYS (Woodruff)
Moltrup Steel Products Co., Beaver Falls, Pa.

KNIVES (Rotary)
American Shear Knife Co., 3rd and Ann Sts., Homestead, Pa.
Cowles Tool Co., 2086 W. 110th St., Cleveland, O.

KNIVES (Shear, Solid Steel, Flying)
American Shear Knife Co., 3rd and Ann Sts., Homestead, Pa.

LABORATORY WARE
Norton Company, Worcester, Mass.

LACQUERS
Sipe, James B., & Co., Inc., So. Hills Branch, Pittsburgh, Pa.

LADLES
Petroleum Iron Works Co., Sharon, Pa.

LAMPS (Filaments)
General Electric Co., Nela Park, Cleveland, O.

LAMPS (Mercury Vapor)
General Electric Vapor Lamp Co., 885 Adams St., Hoboken, N. J.

LAMPS (Neon Glow)
General Electric Vapor Lamp Co., 885 Adams St., Hoboken, N. J.

LAPPING MACHINES
Cincinnati Milling Machine Co., Oakley Sta., Cincinnati, O.

LARRIES (Coal)
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.

LATHES
LeBlond, R. K., Machine Tool Co., 269a Madison Rd., Cincinnati, O.

LATHES (Automatic)
Jones & Lamson Machine Co., Springfield, Vt.

LATHES (Roll Turning)
Continental Roll & Steel Fdry. Co., E. Chicago, Ind.
Hyde Park Foundry & Machine Co., Hyde Park, Pa.
Lewis Fdry. & Mach. Co., P. O. Box 1586, Pittsburgh, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.

LATHES (Turret)
Bullard Company, The, Bridgeport, Conn.
Jones & Lamson Machine Co., Springfield, Vt.

LATHES (Turret) (Automatic Vertical)
Bullard Company, The, Bridgeport, Conn.

LEAD (Chemical, Corroding, Desilvered)
St. Joseph Lead Co., 250 Park Ave., New York City.

LEAD (Tellurium)
National Lead Co., 111 Broadway, New York City.

LEVELING MACHINES
Aetna-Standard Engineering Co., The, Youngstown, O.
Erie Foundry Co., Erie, Pa.
Hyde Park Foundry & Machine Co., Hyde Park, Pa.
McKay Machine Co., Youngstown, O.
Mesta Machine Co., P. O. Box 1466, Pittsburgh, Pa.
Sutton Engineering Co., Park Bldg., Pittsburgh, Pa.
Wean Engineering Co., Warren, O.

LIGHT OIL RECOVERY & TREATMENT EQUIPMENT
Wilputte Coke Oven Corp., 570 Lexington Ave., New York City.

LIFT TRUCKS—See TRUCKS (Lift)

LIFTING MAGNETS—See MAGNETS (Lifting)

LIGHTING (Industrial)
General Electric Vapor Lamp Co., 885 Adams St., Hoboken, N. J.

LINERS (Pump and Cylinder)
Shenango-Penn Mold Co., Dover, O.

LOCOMOTIVE CRANES—See CRANES (Locomotive)

LOCOMOTIVES (Diesel-Electric)
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Plymouth Locomotive Works, Plymouth, O.
Whitcomb Locomotive Div., The Baldwin Locomotive Works, Paschall P. O., Philadelphia, Pa.

LOCOMOTIVES (Diesel Mechanical)
Plymouth Locomotive Works, Plymouth, O.
Whitcomb Locomotive Div., The Baldwin Locomotive Works, Paschall P. O., Philadelphia, Pa.

LOCOMOTIVES (Electric Trolley)
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
General Electric Co., Schenectady, N. Y.
Whitcomb Locomotive Division, The Baldwin Locomotive Works, Paschall P. O. Sta., Philadelphia, Pa.

LOCOMOTIVES (Gasoline-Electric)
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
General Electric Co., Schenectady, N. Y.
Whitcomb Locomotive Division, The Baldwin Locomotive Works, Paschall P. O., Philadelphia, Pa.

LOCOMOTIVES (Gasoline Mechanical)
Whitcomb Locomotive Div., The Baldwin Locomotive Works, Paschall P. O., Philadelphia, Pa.

LOCOMOTIVES (Oil-Electric)
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
Ingersoll-Rand Co., 11 Broadway, New York City.
Whitcomb Locomotive Division, The Baldwin Locomotive Works, Paschall P. O. Sta., Philadelphia, Pa.

LOCOMOTIVES (Storage Battery)
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
General Electric Co., Schenectady, N. Y.
Whitcomb Locomotive Division, The Baldwin Locomotive Works, Paschall P. O. Sta., Philadelphia, Pa.

LOCOMOTIVES (Switching and Transfer)
Cooper-Bessemer Corp., The, Mt. Vernon, O.

LUBRICANTS (Industrial)
Gulf Oil Corp. of Penna., Gulf Refining Co., 3800 Gulf Bldg., Pittsburgh, Pa.
Houghton, E. F., & Co., 240 W. Somerset St., Philadelphia, Pa.
New York & New Jersey Lubricant Co., 292 Madison Ave., New York City.
Penola, Inc., 34th & Smallman Sts., Pittsburgh, Pa.
Pure Oil Co., The, 35 E. Wacker Dr., Chicago, Ill.
Shell Union Oil Corp., 50 W. 50th St., New York City.
Socony Vacuum Oil Co., Inc., 26 Broadway, New York City.
Sun Oil Co., 1608 Walnut St., Philadelphia, Pa.
Tide Water Associated Oil Co., 17 Battery Place, New York City.

LUBRICATING SYSTEMS
Farval Corp., 3270 E. 80th St., Cleveland, O.

MACHINE WORK
Budd, Edw. G., Mfg. Co., 25th St. & Huntington Park Ave., Philadelphia, Pa.
Continental Roll & Steel Fdry. Co., E. Chicago, Ind.
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn.
344 Vulcan St., Buffalo, N. Y.
Federal Shipbuilding & Dry Dock Co., Kearney, N. J.
Hyde Park Foundry & Machine Co., Hyde Park, Pa.
Lewis Foundry & Machine Co., P. O. Box 1586, Pittsburgh, Pa.
Morgan Engineering Co., The, Alliance, O.

MACHINERY (Second Hand)
Marr-Galbreath Machinery Co., 53 Water St., Pittsburgh, Pa.

MACHINERY (Special)
Alliance Machine Co., The, Alliance, O.
Allis-Chalmers Mfg. Co., The, Milwaukee, Wis.
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Brosius, Edgar E., Inc., Sharpsburg, Pa.
Cleveland Punch & Shear Works, 3917 St. Clair Ave., Cleveland, O.
Columbus Die, Tool & Mach. Co., 955 Cleveland Ave., Columbus, O.
Continental Roll & Steel Fdry. Co., E. Chicago, Ind.
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn.
344 Vulcan St., Buffalo, N. Y.
Foote Bros. Gear & Machine Corp., 5301 S. Western Ave., Chicago, Ill.
Lewis Foundry & Machine Co., P. O. Box 1586, Pittsburgh, Pa.
Morgan Engineering Co., The, Alliance, O.
National-Erie Corp., Erie, Pa.
National Roll & Fdry. Co., The, Avonmore, Pa.
Niagara Machine & Tool Works, 637 Northland Ave., Buffalo, N. Y.
Oil Well Supply Co., Dallas, Texas.
Shuster, F. B., Co., The, New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Thomas Machine Mfg. Co., Pittsburgh, Pa.
United Engineering & Fdry. Co. First National Bank Bldg., Pittsburgh, Pa.

MAGNESIA (Electrically Fused)
Norton Co., Worcester, Mass.

MAGNETIC SEPARATORS—See SEPARATORS (Magnetic)

MAGNETS (Lifting)
Dings Magnetic Separator Co., 675 Smith St., Milwaukee, Wis.
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.
Ohio Electric Mfg. Co., The, 5906 Maurice Ave., Cleveland, O.
Stearns Magnetic Mfg. Co., 650 So. 28th St., Milwaukee, Wis.

MAGNETS (Separating)
Dings Magnetic Separator Co., 675 Smith St., Milwaukee, Wis.
Ohio Electric Mfg. Co., The, 5906 Maurice Ave., Cleveland, O.
Stearns Magnetic Mfg. Co., 650 So. 28th St., Milwaukee, Wis.

MANGANESE METAL AND ALLOYS
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.

MANGANESE ORE
Samuel, Frank, Co., Inc., Harrison Bldg., Philadelphia, Pa.

MANIPULATORS
Alliance Machine Co., The, Alliance, O.
Continental Roll & Steel Fdry. Co., E. Chicago, Ind
Morgan Engineering Co., The, Alliance, O.

MARKERS (Industrial)
Helmer-Staley, Inc., 325 W. Huron St., Chicago, Ill.

MARKING DEVICES
Helmer-Staley, Inc., 325 W. Huron St., Chicago, Ill.

METAL (Perforated)—See PERFORATED METAL

METAL BLAST ABRASIVES (Shot and Grit)
Pittsburgh Crushed Steel Co., 61st St. and A. V. R. R., Pittsburgh, Pa.

METAL CLEANERS
American Chemical Paint Co., Ambler, Pa.
Houghton, E. F., & Co., 240 W. Somerset St., Philadelphia, Pa.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia, Pa.

METAL SPECIALTIES AND PARTS—See STAMPINGS

METAL STAMPINGS—See STAMPINGS

METALS (Nonferrous)
International Nickel Co., Inc., The, 67 Wall St., New York City.

MICROMETERS
Brown & Sharpe Mfg. Co., Providence, R. I.

MILLING MACHINES
Brown & Sharpe Mfg. Co., Providence, R. I.
Cincinnati Milling Machine Co., Oakley Sta., Cincinnati, O.

MILLING MACHINES (Milling and Centering Combined)
Jones & Lamson Machine Co., Springfield, Vt.

MILLS (Blooming, Universal, Plate, Sheet, Tin, Bar, Strip, Etc.)—See ROLLING MILL EQUIPMENT

MOLDS (Ingot)—See INGOT MOLDS

MOLYBDENUM
Climax Molybdenum Co., 500 Fifth Ave., New York City.

MONEL METAL (All Commercial Forms)
International Nickel Co., Inc., The, 67 Wall St., New York City.

MONORAIL SYSTEMS
American MonoRail Co., The, 13107 Athens Ave., Cleveland, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, O.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

MOTORS (Electric)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Fairbanks, Morse & Co., 600 So. Wabash Ave., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Lincoln Electric Co., The, Cleveland O., Dept. 20-5.
Reliance Electric & Mfg. Co., 1088 Ivanhoe Rd., Cleveland, O.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.
Wagner Electric Corp., 4904 Baum Blvd., Pittsburgh, Pa.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

MUCK BAR
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia, Pa.

NAILS
(*Also Stainless)
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
*Pittsburgh Steel Co., Grant Bldg., Pittsburgh, Pa.
*Republic Steel Corp., Dept. ST, Cleveland, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Wickwire Brothers, 189 Main St., Cortland, N. Y.
Wickwire Spencer Steel Co., 41 E. 42nd St., New York City.
Youngstown Sheet & Tube Co., The, Youngstown, O.

NAILS (Coated and Galvanized)
Wickwire Brothers, 189 Main St., Cortland, N. Y.

NICKEL (All Commercial Forms)
International Nickel Co., Inc., The, 67 Wall St., New York City.

NICKEL (Shot)
International Nickel Co., Inc., The, 67 Wall St., New York City.

NICKEL STEEL (Cold Drawn)
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Republic Steel Co., Dept. ST, Cleveland, O.
Union Drawn Steel Co., Massillon, O.

NUTS
(*Also Stainless)
Bethlehem Steel Co., Bethlehem, Pa.
Cleveland Cap & Screw Co., 2935 E. 79th St., Cleveland, O.
Ohio Nut & Bolt Co., The, 600 Front St., Berea, O.
*Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Tinnerman Stove & Range Co., 2039 Fulton Rd., Cleveland, O.

NUTS (Castellated)
Bethlehem Steel Co., Bethlehem, Pa.
Cleveland Cap Screw Co., 2935 E. 79th St., Cleveland, O.
Republic Steel Corp., Upson Nut Div., Dept. ST. 1912 Scranton Rd., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS (Cold Punched)
Bethlehem Steel Co., Bethlehem, Pa.
Cleveland Cap Screw Co., 2935 E. 79th St., Cleveland, O.
Ohio Nut & Bolt Co., The, 600 Front St., Berea, O.
Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS (Hot Pressed)
Bethlehem Steel C... Bethlehem, Pa.
Cleveland Cap Scr... 2935 E. 79th St.
Republic Steel Cor... Upson Nut Div., 1912 Scranton R...
Russell, Burdsall ... Nut Co., Port C...

NUTS (Semi-Finish...
Bethlehem Steel C... Bethlehem, Pa.
Cleveland Cap Scre... 2935 E. 79th St.
Republic Steel Cor... Upson Nut Div., 1912 Scranton R...
Russell, Burdsall ... Nut Co., Port Ch...

NUTS (Wing)
Parker-Kalon Corp., 200 Varick St., N...

OIL RETAINERS
Chicago Rawhide M... 1308 Elston Ave...

OILS (Cutting)
Gulf Oil Corp of P... Gulf Refining C... 3800 Gulf Bldg...
Houghton, E. F., ... Somerset St., Phi...
Penola, Inc., 34th & ... Pittsburgh, Pa.
Pure Oil Co., The, 35 E. Wacker Dr...
Shell Union Oil Corp., 50 W. 50th St., N...
Sipe, James B., & ... So. Hills Branch...
Socony-Vacuum Oil ... 26 Broadway, New...
Sun Oil Co., 1608 W... Philadelphia, Pa.
Tide Water Associa... 17 Battery Place...

OILS (Drawing)
Houghton, E. F., & ... Somerset St., Phil...

OILS (Lubricating)—LUBRICANTS (Ind...

OILS (Paint)
Sipe, James B., & C... So. Hills Branch...

OILS (Rust Preventi...
American Chemical ... Ambler, Pa.
Sipe, James B., & C... So. Hills Branch, P...

OPEN-HEARTH FU... FURNACES (Oper...

OVENS (Annealing, ... Tempering)
Hagan, Geo. J., Co... 2400 E. Carson S...
Stewart Furnace Div... Chicago Flexible S... 1106 So. Central Av...

OVENS (Coke, By-Pr... Recovery)
Koppers Co., Engine... struction Div., Pitt...

OVENS (Core and M...
Pennsylvania Indust... 2413 W. Magnolia ... Pittsburgh, Pa.

OXY-ACETYLENE W... AND CUTTING—S...

OXYGEN IN CYLIN...
Air Reduction Sales ... 60 E. 42nd St., New...
Linde Air Products C... 30 E. 42nd St., New...
National Cylinder Gas ... 205 W. Wacker Dr...

PACKING (Asbestos ...
Goodyear Tire & Rubb... Akron, O.
Johns-Manville Corp., 22 E. 40th St., New...
United States Rubber ... 1790 Broadway, New...

PACKINGS—MECHAN... LEATHER (Cup, U... and Vees)
Chicago Rawhide Mfg. ... 1308 Elston Ave., C...
Houghton, E. F., & ... Somerset St., Phila...

PAINT (Alkali Resist...
Pennsylvania Salt M... Widener Bldg., Phila...
Sipe, James B., & Co... So. Hills Branch, Pit...

PAINT (Aluminum)
Koppers Co., Tar & C... Pittsburgh, Pa.
Sipe, James B., & Co... So. Hills Branch, Pit...

HERE-TO-BUY

Resisting)
ical Paint Co.,

& Co. Inc.,
nch, Pittsburgh, Pa.

trial)
& Co. Inc.,
nch, Pittsburgh, Pa.

ng)
Inc.,
n St., Chicago, Ill.
ar & Chemical Div.,
Pa.
& Co. Inc.,
nch, Pittsburgh, Pa.

eatment)
ical Paint Co.,

& Co. Inc.,
nch, Pittsburgh, Pa.

Preventive)
ical Paint Co.,

ar & Chemical Div.,
Pa.
& Co. Inc.,
nch, Pittsburgh, Pa.

Form)
Inc.,
n St., Chicago, Ill.

METAL
ating Co.,
Pl., Chicago, Ill.
ing Co.,
, Rochester, N. Y.
King Perforating Co.,
e St., Chicago, Ill.
er Steel Co.,
St., New York City.

OVERY PLANTS
Engineering and Con-
., Pittsburgh, Pa.
Oven Corp.,
n Ave.,
ity.

OMPOUND
nical Paint Co.,

F., & Co., 240 W.
., Philadelphia, Pa.
M., Co., The,
d Bldg.,
Pa.
Salt Mfg. Co., 1000
lg., Philadelphia, Pa.

QUIPMENT
Nickel Co., Inc., The,
New York City.

ACHINERY
d Engineering Co.,
town, O.
Co., Erie, Pa.
& Machine Co.,
1586, Pittsburgh, Pa.
e Co.,
466, Pittsburgh, Pa.
ring Co., Warren, O.

ANK LININGS
d Rubber Co.,
t., New York City.
Co., 1443 W. Market
ville, O.
Salt Mfg. Co., 1000
lg., Philadelphia, Pa

ANKS—See TANKS

INTS
Alloy Casting Corp.,
dianola Ave.,
, O.

teel Co.,
en, Pa.
eel Co.,
Pa.
G., Iron Co.,
Pa.
is Steel Corp.,
Chicago.
s Iron Co., Union
Bldg., Cleveland, O.
ce Corp., The,
troit, Mich.
& Steel Co.,

hlin Steel Corp.,
aughlin Bldg.,
Pa.
l Corp., Dept. ST,
O.
k & Co., Inc.,
dg., Philadelphia, Pa.
nace Co.,
., Pittsburgh, Pa.
., & Co.,
, Pittsburgh, Pa.
al, Iron & Railroad
-Marx Bldg.,
, Ala.
Co.
gan Ave., Chicago, Ill.

PILING (Iron and Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Inland Steel Co., 38 South Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Republic Steel Co., Dept. ST, Cleveland, O.

PILING (Pressure-Treated Wood)
Wood Preserving Corp., The, Koppers Bldg., Pittsburgh, Pa.

PILLOW BLOCKS (Ball)
Ahlberg Bearing Co., 3025 W. 47th St., Chicago, Ill.

PILLOW BLOCKS (Roller Bearing)
Ahlberg Bearing Co., 3025 W. 47th St., Chicago, Ill.
Link-Belt Co., 519 N. Holmes Ave., Indianapolis, Ind.
Shafer Bearing Corp., 35 E. Wacker Drive, Chicago, Ill.

PILLOW BOXES
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia, Pa.

PINIONS (Mill)
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Continental Roll & Steel Fdry. Co., E. Chicago, Ind.
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn.
344 Vulcan St., Buffalo, N. Y.
Horsburgh & Scott Co., The, 5114 Hamilton Ave., Cleveland, O.
National-Erie Corp., Erie, Pa.
Simonds Gear & Mfg. Co., The, 2501 Liberty St., Pittsburgh, Pa.
United Engineering & Foundry Co., First National Bank Bldg., Pittsburgh, Pa.

PINS (Taper)
Moltrup Steel Products Co., Beaver Falls, Pa.

PIPE (Brass, Bronze, Copper—Rubber or Rubber Lined)
American Hard Rubber Co., 11 Mercer St., New York City.

PIPE (Brass, Bronze, Copper)
American Brass Co., The, 25 Broadway, New York City.
Bridgeport Brass Co., Bridgeport, Conn.
Shenango-Penn Mold Co., Dover, O.

PIPE (New and Used)
Foster, L. B., Co., Inc., P. O. Box 1647, Pittsburgh, Pa.

PIPE (Square and Rectangular)
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE (Steel)
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
American Rolling Mill Co., The, Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Crane Co., The, 836 So. Michigan Blvd., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Western Gas Div., The Koppers Co., Fort Wayne, Ind.
Youngstown Sheet & Tube Co., The, Youngstown, O.

PIPE BALLS
Youngstown Alloy Casting Corp., 103 E. Indianola Ave., Youngstown, O.

PIPE BENDING
Crane Co., The, 836 So. Michigan Blvd., Chicago, Ill.

PIPE CUTTING AND THREADING MACHINERY
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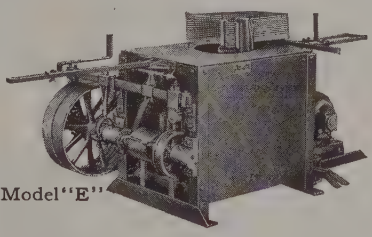
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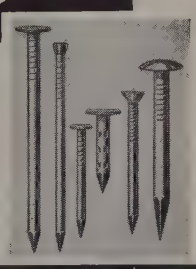
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Worthington Pump & Machy. Corp., Harrison, N. J.

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Petroleum Iron Works Co., Sharon, Pa.

PIPE MILL MACHINERY
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United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.

PIPE STRAIGHTENING MACHINERY
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Logeman Brothers Co., 3126 Burleigh St., Milwaukee, Wis.
Sutton Engineering Co., McKees Rocks, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.

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PIPING CONTRACTORS
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Bliss & Laughlin, Inc., Harvey, Ill.
Heppenstall Co., 47th and Hatfield Sts., Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Kropp Forge Co., 5301 W. Roosevelt Blvd., Chicago, Ill.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Standard Steel Works Co., Paschall P. O., Philadelphia, Pa.
Union Drawn Steel Co., Massillon, O.

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*American Rolling Mill Co., Middletown, O.
*Bethlehem Steel Co., Bethlehem, Pa.
*Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
*Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
*Republic Steel Corp., Dept. ST, Cleveland, O.
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Worth Steel Co., Claymont, Del.
Youngstown Sheet & Tube Co., The, Youngstown, O.

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PLATES (Steel—Floor)—See FLOORING (Steel)

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PLUGS (Rubber)
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Western Precipitation Corp., 1016 W. 9th St., Los Angeles, Calif.

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Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn.
344 Vulcan St., Buffalo, N. Y.
Logeman Brothers Co., 3126 Burleigh St., Milwaukee, Wis.
Niagara Machine & Tool Works, 637 Northland Ave., Buffalo, N. Y.
Tomkins-Johnson Co., 611 N. Mechanics St., Jackson, Mich.

PRESSES (Forging)
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Mesta Machine Co., P. O. Box 1466, Pittsburgh, Pa.
Morgan Engineering Co., Alliance, O.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.

PRESSES (Forming and Braking)
Cincinnati Shaper Co., Elam and Garrard Sts., Cincinnati, O.

PRESSES (Hydraulic)
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Chambersburg Engineering Co., Chambersburg, Pa.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn.
344 Vulcan St., Buffalo, N. Y.
Hannifin Mfg. Co., 621-631 So. Kolmar Ave., Chicago, Ill.
Lake Erie Engineering Corp., Kenmore Sta., Buffalo, N. Y.
Logeman Brothers Co., 3126 Burleigh St., Milwaukee, Wis.
Mesta Machine Co., P. O. Box 1466, Pittsburgh, Pa.
Morgan Engineering Co., The, Alliance, O.
Wood, R. D., Co., 400 Chestnut St., Philadelphia, Pa.

PRESSES (Punching, Drawing, Coining, Blanking, etc.)
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Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo, N. Y.

PRESSES (Riveting)
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Logeman Brothers Co., 3126 Burleigh St., Milwaukee, Wis.

PRESSES (Welding)—See WELDERS

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American Hard Rubber Co., 11 Mercer St., New York City.
Mesta Machine Co., P. O. Box 1466, Pittsburgh, Pa.
Oil Well Supply Co., Dallas, Texas.

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Worthington Pump & Machinery Corp., Harrison, N. J.

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Worthington Pump & Machinery Corp., Harrison, N. J.

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Worthington Pump & Machinery Corp., Harrison, N. J.

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Chambersburg Engineering Co., Chambersburg, Pa.
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Lewis Foundry & Machine Co., P. O. Box 1586, Pittsburgh, Pa.
Morgan Engineering Co., The, Alliance, O.
Niagara Machine & Tool Works, 637 Northland Ave., Buffalo, N. Y.
Thomas Machine Mfg. Co., Pittsburgh, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.

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Norton Company, Worcester, Mass.

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Brown Instrument
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Philadelphia, Pa
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ton Ave., Philad

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Co., 5301 W. Roose-
Chicago, Ill.
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The, Nicetown,
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Forging Co.,
o St., Buffalo, N. Y.

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., Chicago, Ill.

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Co., 400 Chestnut
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Pa.
Co., 38 S. Dearborn
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fg. Co.,
Conn.
el Corp.,
Div., Dept. ST,
on Rd., Cleveland, O.
dsall & Ward Bolt &
rt Chester, Pa.

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Fitzsimons Co., The, 1623 Wilson Ave., Youngstown, O.
Kidd Drawn Steel Co., Aliquippa, Pa.

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Vulcan Steam Forging Co., 220-250 Rano St., Buffalo, N. Y.

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*Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
*Republic Steel Corp., Dept. St., Cleveland, O.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Timken Steel & Tube Co., Canton, O.
Titan Metal Mfg. Co., Bellefonte, Pa.
Washburn Wire Co., Phillipsdale, R. I.
Youngstown Sheet & Tube Co., Youngstown, O.

RODS (Steel and Iron)
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RODS (Welding)—See WELDING RODS

RODS (Wire)—See WIRE PRODUCTS

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Goodyear Tire & Rubber Co., Akron, O.

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ROLLING MILL BEARINGS—See BEARINGS (Rolling Mill)

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Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn. 344 Vulcan St., Buffalo, N. Y.
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Lewis Fdry. & Mach. Co., P. O. Box 1586, Pittsburgh, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
Morgan Engineering Co., The, Alliance, O.
National Roll & Foundry Co., The, Avonmore, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.
Wean Engineering Co., Warren, O.

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Stearns Magnetic Mfg. Co., The, 650 So. 28th St., Milwaukee, Wis.

ROLLS (Sand and Chilled)
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Lewis Foundry & Machine Co., P. O. Box 1586, Pittsburgh, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh, Pa.
National Roll & Foundry Co., The, Avonmore, Pa.
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Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn.
344 Vulcan St., Buffalo, N. Y.
Hyde Park Fdry. & Mach. Co., Hyde Park, Pa.
Lewis Foundry & Machine Co., P. O. Box 1586, Pittsburgh, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
National Roll & Fdry. Co., The, Avonmore, Pa.
Ohio Steel Fdry. Co., Lima, O.
Pittsburgh Rolls Corp., 41st and Willow Sts., Pittsburgh, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.

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American Rolling Mill Co., The, Middletown, O.
Andrews Steel Co., The, Newport, Ky.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Sons, Inc., 16th and Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

ROOFING (Plastic and Liquid)
Koppers Co., Tar & Chemical Div., Pittsburgh, Pa.

RUBBER GOODS (Mechanical)
Goodyear Tire & Rubber Co., Akron, O.
Rhoades, R. W., Metaline Co., 50 3rd St., Long Island City, N. Y.
United States Rubber Co., 1790 Broadway, New York City.

RUBBER PLUGS—See PLUGS

RUST PREVENTIVES
American Chemical Paint Co., Ambler, Pa.
Houghton, E. F., & Co., 240 W. Somerset St., Philadelphia, Pa.
Koppers Co., Tar & Chemical Div., Pittsburgh, Pa.
Stop-Rust Co., The, P. O. Box 494, Chattanooga, Tenn.

RUST PROOFING PROCESS
American Chemical Paint Co., Ambler, Pa.
Koppers Co., Tar & Chemical Div., Pittsburgh, Pa.
Stop-Rust Co., The, P. O. Box 494, Chattanooga, Tenn.

SAFE ENDS (Boiler Tube)
National Tube Co., Frick Bldg., Pittsburgh, Pa.

SAFETY DEVICES (Electric)
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.

SALT TABLETS
Morton Salt Co., 208 W. Washington St., Chicago, Ill.

SAND CONDITIONING AND PREPARING MACHINERY
Dings Magnetic Separator Co., 675 Smith St., Milwaukee, Wis.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

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Morgan Engineering Co., The, Alliance, O.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.

SAWS (Inserted Tooth, Cold)
Simonds Saw & Steel Co., Fitchburg, Mass.

SAWS (Metal Cutting)
Simonds Saw & Steel Co., Fitchburg, Mass.
Youngstown Sheet & Tube Co., Youngstown, O.

SCALES
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
Fairbanks, Morse & Co., 600 So. Wabash Ave., Chicago, Ill.
Kron Co., The, Bridgeport, Conn.

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Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
Fairbanks, Morse & Co., 600 So. Wabash Ave., Chicago, Ill.
Kron Co., The, Bridgeport, Conn.

SCALES (Monorail)
American MonoRail Co., The, 13107 Athens Ave., Cleveland, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, O.
Kron Co., The, Bridgeport, Conn.
Shepard-Niles Crane & Hoist Corp., Montour Falls, N. Y.

SCALING TOOLS (Pneumatic)
Ingersoll-Rand Co., 11 Broadway, New York City.

SCRAP BALING PRESSES—See BALING PRESSES

SCREENS AND SIEVES
Chicago Perforating Co., 2443 W. 24th Pl. Chicago, Ill.
Erdle Perforating Co., 171 York St., Rochester, N. Y.
Harrington & King Perforating Co., 5634 Fillmore St., Chicago, Ill.
Koppers Co., Engineering & Construction Div., Pittsburgh, Pa.
Wickwire Spencer Steel Co., 41 E. 42nd St., New York City.

SCREW EXTRACTORS
Greenfield Tap & Die Corp., Greenfield, Mass.

SCREW MACHINE PRODUCTS
Barnes, Wallace, Co., The, Div. Associated Spring Corp., Bristol, Conn.
Hindley Mfg. Co., Valley Falls, R. I.
Progressive Mfg. Co., Torrington, Conn.
Titan Metal Mfg. Co., Bellefonte, Pa.

SCREW MACHINES (Automatic, Single and Multiple Spindle)
Brown & Sharpe Mfg. Co., Providence, R. I.

SCREW PLATES
Greenfield Tap & Die Corp., Greenfield, Mass.

SCREW STOCK—See STEEL (Screw Stock)

SCREWS
Cleveland Cap Screw Co., 2935 E. 79th St., Cleveland, O.
Ohio Nut & Bolt Co., The, 600 Front St., Berea, O.
Parker-Kalon Corp., 200 Varick St., New York City.
Progressive Mfg. Co., Torrington, Conn.

SCREWS (Cap, Set, Safety-Set)
Cleveland Cap Screw Co., 2935 E. 79th St., Cleveland, O.
Standard Pressed Steel Co., Stewart Ave., & Kenmire St., Jenkintown, Pa.

SCREWS (Cold Headed)
Cleveland Cap Screw Co., 2935 E. 79th St., Cleveland, O.
Ohio Nut & Bolt Co., The, 600 Front St., Berea, O.

SCREWS (Conveyor)
Lee Spring Co. Inc., 30 Main St., Brooklyn, N. Y.

SCREWS (Drive)
Parker-Kalon Corp., 200 Varick St., New York City.

SCREWS (Hardened Self-Tapping)
Parker-Kalon Corp., 200 Varick St., New York City.

SCREWS (Machine)
Ohio Nut & Bolt Co., The, 600 Front St., Berea, O.
Progressive Mfg. Co., Torrington, Conn.

SCREWS (Machine, Recessed Head)
American Screw Co., Providence, R. I.
Chandler Products Co., Euclid, O.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.
Lamson & Sessions Co., The, Cleveland, O.
National Screw & Mfg. Co., Cleveland, O.
Parker-Kalon Corp., New York City.
Pheoll Mfg. Co., Chicago, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Mfg. Co., Waterbury, Conn.

SCREWS (Sheet Metal, Recessed Head)
American Screw Co., Providence, R. I.
Chandler Products Co., Euclid, O.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.
Lamson & Sessions Co., The, Cleveland, O.
National Screw & Mfg. Co., Cleveland, O.
Parker-Kalon Corp., New York City.
Pheoll Mfg. Co., Chicago, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

SCREWS (Socket, Cold Forged)
Parker-Kalon Corp., 200 Varick St., New York City.

SCREWS (Socket, Head, Cap)
Standard Pressed Steel Co., Stewart Ave., & Kenmire St., Jenkintown, Pa.

SCREWS (Thumb)
Parker-Kalon Corp., 200 Varick St., New York City.

SCREWS (Wood, Recessed Head)
American Screw Co., Providence, R. I.
Chandler Products Co., Euclid, O.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.
Lamson & Sessions Co., The, Cleveland, O.
National Screw & Mfg. Co., Cleveland, O.
Pheoll Mfg. Co., Chicago, Ill.

SEAMLESS STEEL TUBING—See TUBES

SEPARATORS (Magnetic)
Dings Magnetic Separator Co., 675 Smith St., Milwaukee, Wis.
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.
Ohio Electric Mfg. Co., The, 5906 Maurice Ave., Cleveland, O.
Stearns Magnetic Mfg. Co., 650 So. 28th St., Milwaukee, Wis.

SEPARATORS (Sand)
Dings Magnetic Separator Co., 675 Smith St., Milwaukee, Wis.
Stearns Magnetic Mfg. Co., 650 So. 28th St., Milwaukee, Wis.

SHAFT HANGERS—See HANGERS (Shaft)

SHAFTING
American Hollow Boring Co., 1054 W. 20th St., Erie, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Commercial Forgings Co., 3710 E. 91st St., Cleveland, O.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Standard Steel Works Co., Paschall P. O., Philadelphia, Pa.
Union Drawn Steel Co., Massillon, O.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.
Wyckoff Drawn Steel Co., First National Bank Bldg., Pittsburgh, Pa.

SHAFTS (Clutch)
American Hollow Boring Co., 1054 W. 20th St., Erie, Pa.

SHAPERS
Cincinnati Shaper Co., Garrard and Elam Sts., Cincinnati, O.

SHAPES (Brass, Bronze, Nickel Silver)
Titan Metal Mfg. Co., Bellefonte, Pa.

SHAPES (Steel)—See STEEL (Structural)

SHAPES, SPECIAL (Steel)
Bliss & Laughlin, Inc., Harvey, Ill.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Pressed Steel Tank Co., Milwaukee, Wis.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Union Drawn Steel Co., Massillon, O.

SHEAR BLADES
American Shear Knife 3rd and Ann Sts., I
Cleveland Punch & Sh 3917 St. Clair Ave
Heppenstall Co., 47th Sts., Pittsburgh, P

SHEARS
Aetna-Standard Engi The, Youngstown,
Beatty Machine & M Hammond, Ind.
Cincinnati Shaper Co., Elam Sts., Cincinn
Cleveland Punch & She 3917 St. Clair Ave
Continental Roll & Ste E. Chicago, Ind
Hyde Park Fdry. & M Hyde Park, Pa.
Lewis Fdry. & Mac P. O. Box 1586 Pitt
Morgan Engineering Alliance, O.
Niagara Machine & T 637 Northland Ave. N. Y.
Thomas Machine Mfg Pittsburgh, Pa.
United Engineering & First National Bank Pittsburgh, Pa.

SHEET BARS
Andrews Steel Co., The Newport, Ky.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Pittsburgh-Chicago
Columbia Steel Co., San Francisco, Cali
Jones & Laughlin Steel Jones & Laughlin B Pittsburgh, Pa.
Republic Steel Corp. Cleveland, O.
Tennessee Coal, Iron Co., Brown-Marx Bl Birmingham, Ala.
Wisconsin Steel Co. 180 No. Michigan Ave
Youngstown Sheet & Youngstown, O.

SHEET CARRIERS
American MonoRail Co. 13107 Athens Ave.
Cullen-Friestedt Co., 1308 Kilbourn Ave.
Hyde Park Fdry. & Hyde Park, Pa.
J-B Engineering Sales New Haven, Conn

SHEET METAL PRO See STAMPINGS

SHEET METAL WOR MACHINES
Cincinnati Shaper Co. Garrard Sts., Cincinn
Excelsior Tool & Mac Ridge and Jefferson East St. Louis, Ill.
Niagara Machine & T 637 Northland Ave N. Y.

SHEET STEEL ASSE (Fabricated)
Budd, Edw. G., Mfg. 25th St. & Hunting Philadelphia, Pa.

SHEET STEEL PILIN (New and Used)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Pittsburgh-Chicago
Foster, L. B., Co., In P. O. Box 1647, Pitts

SHEETS (Acid Resisti
International Nickel Co 67 Wall St., New Yo

SHEETS (Black)
American Steel & Wire Rockefeller Bldg., C
Andrews Steel Co., The Newport, Ky.
Granite City Steel Co. Granite City, Ill.
Great Lakes Steel Corp Detroit, Mich.
Inland Steel Co., 38 So. St., Chicago, Ill.
Jones & Laughlin Steel Jones & Laughlin Bl Pittsburgh, Pa.
Ryerson, Jos. T., & Son 16th & Rockwell Sts.
Tennessee Coal, Iron & Co., Brown-Marx Bld Birmingham, Ala.

Bronze, Copper, Silicon-Bronze)
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Oliver Bldg.,
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Rolled and Hot
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Co.,
Pa.

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
American Rolling Mill Co., Middletown, O.
Andrews Steel Co., The, Newport, Ky.
Apollo Steel Co., Oliver Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Granite City Steel Co., Granite City, Ill.
Great Lakes Steel Corp., Ecorse, Detroit, Mich.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS (Long Terne)

Andrews Steel Co., The, Newport, Ky.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS (Perforated)

Harrington & King Perforating Co., 5634 Fillmore St., Chicago, Ill.

SHEETS (Reinforced)

Erdle Perforating Co., 171 York St., Rochester, N. Y.

SHEETS (Roofing)—See ROOFING AND SIDING

SHEETS (Stainless)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
American Rolling Mill Co., The, Middletown, O.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Republic Steel Corp., Massillon, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.

SHEETS (Stainless Clad)

Granite City Steel Co., Granite City, Ill.

SHEETS (Tin)—See TIN PLATE

SHEETS (Tin Mill Black)

Andrews Steel Co., The, Newport, Ky.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.

SHEETS—HIGH FINISH (Automobile, Metal Furniture, Enameling)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
American Rolling Mill Co., The, Middletown, O.
Andrews Steel Co., The, Newport, Ky.
Apollo Steel Co., Oliver Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.

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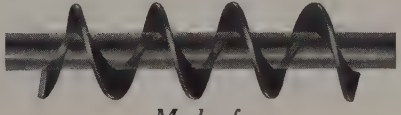

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LEE SPRING CO., INC.
30 Main Street Brooklyn, N. Y.

SHEETS—HIGH FINISH—Con.
Great Lakes Steel Corp., Ecorse, Detroit, Mich.
Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SIEVES—See SCREENS AND SIEVES

SILICO-MANGANESE
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.
Ohio Ferro-Alloys Corp., Citizens Bldg., Canton, O.
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia, Pa.

SILICON METAL AND ALLOYS
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.

SKELP (Steel)
Alan Wood Steel Co., Conshohocken, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.

SLAG GRANULATING MACHINES (Blast Furnace and Open Hearth)
Brosius, Edgar E., Inc., Sharpsburg, Pa.

SMALL TOOLS
Brown & Sharpe Mfg. Co., Providence, R. I.
Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland, O.

SOAKING PITS
Amsler-Morton Co., Fulton Bldg., Pittsburgh, Pa.
Criswell, James, Co., Keenan Bldg., Pittsburgh, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo, O.

SOLVENT (Degreasing)
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia, Pa.

SPACING TABLES
Thomas Machine Mfg. Co., Pittsburgh, Pa.

SPECIAL MACHINERY—See MACHINERY (Special)

SPEED REDUCERS
Cleveland Worm & Gear Co. 3249 E. 80th St., Cleveland, O.
Farrel-Birmingham Co., Inc., 110 Main St., Ansonia, Conn. 344 Vulcan St., Buffalo, N. Y.
Foote Bros. Gear & Machine Corp., 5301 S. Western Ave., Chicago, Ill.
Grant Gear Works, 2nd and B Sts., Boston, Mass.
Horsburgh & Scott Co., The, 5114 Hamilton Ave., Cleveland, O.
James, D. O., Mfg. Co., 1114 W. Monroe St., Chicago, Ill.
Jones, W. A., Fdry. & Mach. Co., 4401 W. Roosevelt Rd., Chicago, Ill.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis, Ind.
New Departure Div., General Motors Corp., Bristol, Conn.

SPIEGELEISEN
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.
New Jersey Zinc Co., 160 Front St., New York City.
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia, Pa.

SPIKES (Screw)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Republic Steel Corp., Dept. ST, Cleveland, O.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Youngstown Sheet & Tube Co., Youngstown, O.

SPINDLES (Lathe)
American Hollow Boring Co., 1054 W. 20th St., Erie, Pa.

SPLICE BARS (Rail)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.

SPRINGS (*Also Stainless)
*American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Barnes, Wallace, Co., The, Div. Associated Spring Corp., Bristol, Conn.
Duer Spring & Mfg. Co., Pittsburgh, Pa.
Hubbard, M. D., Spring Co., 613 Central Ave., Pontiac, Mich.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Raymond Mfg. Co., Div. Associated Spring Corp., Corry, Pa.
Standard Steel Works Co., Paschall P. O., Philadelphia, Pa.
Washburn Wire Co., 118th St. & Harlem River, New York City.
Wickwire Spencer Steel Co., 41 E. 42nd St., New York City.

SPRINGS (Oil Tempered—Flat)
Davis Brake Beam Co., Laurel Ave., & P. R. R., Johnstown, Pa.

SPROCKETS
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.

SPRUE CUTTERS
Shuster, F. B., Co., The, New Haven, Conn.

STACKS (Steel)—See BRIDGES, ETC.

STAINLESS STEEL—See BARS, SHEETS, STRIP, PLATES, ETC.

STAMPINGS
American Tube & Stamping Plant, (Stanley Wks.), Bridgeport, Conn.
Barnes, Wallace, Co., The, Div. Associated Spring Corp., Bristol, Conn.
Budd, Edw. G., Mfg. Co., 25th St. & Huntington Park Ave., Philadelphia, Pa.
Crosby Co., The, 183 Pratt St., Buffalo, N. Y.
Davis Brake Beam Co., Laurel Ave., & P. R. R., Johnstown, Pa.
Erdle Perforating Co., 171 York St., Rochester, N. Y.
Hubbard, M. D., Spring Co., 613 Central Ave., Pontiac, Mich.
Pressed Steel Tank Co., Milwaukee, Wis.
Raymond Mfg. Co., Div. Associated Spring Corp., Corry, Pa.
Stanley Works, The, New Britain, Conn.
Toledo Stamping & Mfg. Co., 99 Fearing Blvd., Toledo, O.
Whitehead Stamping Co., 1661 W. Lafayette Blvd., Detroit, Mich.

STAPLES (Wire)
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Columbia Steel Co., San Francisco, Calif.
Keystone Steel & Wire Co., Peoria, Ill.
Republic Steel Corp., Dept. ST, Cleveland, O.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Wickwire Brothers, 189 Main St., Cortland, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

STARTERS (Electric Motor)
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.

STEEL (Alloy)
Alan Wood Steel Co., Conshohocken, Pa.
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Firth-Sterling Steel Co., McKeesport, Pa.
Fitzsimons Co., The, 1623 Wilson Ave., Youngstown, O.
Heppenstall Co., 47th & Hatfield Sts., Pittsburgh, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Simonds Saw & Mfg. Co., Fitchburg, Mass.
Stanley Works, The, New Britain, Conn. Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Timken Steel & Tube Co., Canton, O.
Washburn Wire Co., Phillipsdale, R. I.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.

STEEL (Alloy, Cold Finished)
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Bliss & Laughlin, Inc., Harvey, Ill.
Firth-Sterling Steel Co., McKeesport, Pa.
LaSalle Steel Co., P. O. Box 6800-A, Chicago, Ill.
Moltrup Steel Products Co., Beaver Falls, Pa.
Union Drawn Steel Co., Massillon, O.
Wyckoff Drawn Steel Co., First National Bank Bldg., Pittsburgh, Pa.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.

STEEL (Clad—Corrosion Resisting) (*Also Stainless)
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
*Granite City Steel Co., Granite City, Ill.
Superior Steel Corp., Carnegie, Pa.

STEEL (Cold Drawn)
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Bliss & Laughlin, Inc., Harvey, Ill.
Firth-Sterling Steel Co., McKeesport, Pa.
Kidd Drawn Steel Co., Aliquippa, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Union Drawn Steel Co., Massillon, O.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.
Wyckoff Drawn Steel Co., First National Bank Bldg., Pittsburgh, Pa.

STEEL (Cold Finished)
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Firth-Sterling Steel Co., McKeesport, Pa.
Fitzsimons Co., The, 1623 Wilson Ave., Youngstown, O.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Union Drawn Steel Co., Massillon, O.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.
Wyckoff Drawn Steel Co., First National Bank Bldg., Pittsburgh, Pa.

STEEL (Corrosion Resisting)
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
American Rolling Mill Co., The, Middletown, O.
American Steel & Wire Co., Rockefeller Bldg., Cleveland, O.
Andrews Steel Co., The, Newport, Ky.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Firth-Sterling Steel Co., McKeesport, Pa.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 So. Dearborn St.
Jessop, Wm., & Sons, 121 Varick St., N.
Midvale Co., The, Philadelphia, Pa.
National Forge & Gu Irvine, Warren Co.
National Tube Co., Frick Bldg., Pitts.
Republic Steel Corp Cleveland, O.
Ryerson, Jos. T., & 16th & Rockwell St.
Stanley Works, The, New Britain, Conn. Bridgeport, Conn.
Superior Steel Corp.
Timken Steel & Tube Canton, O.

STEEL (Die)
Allegheny Ludlum St Oliver Bldg., Pitts
Jessop, Wm., & Sons 121 Varick St., Ne

STEEL (Drill)
Allegheny Ludlum St Oliver Bldg., Pitts

STEEL (Electric)
Allegheny Ludlum S. Oliver Bldg., Pitt
Bethlehem Steel Co. Bethlehem, Pa.
Carnegie-Illinois Stee Pittsburgh-Chicago
Firth-Sterling Steel McKeesport, Pa.
Inland Steel Co., 38 So. Dearborn St.
Jessop, Wm., & Sons 121 Varick St., New
Latrobe Electric Steel Latrobe, Pa.
National Forge & Ord Irvine, Warren Co.
Republic Steel Corp., Cleveland, O.
Timken Steel & Tube Canton, O.

STEEL (High Speed)
Allegheny Ludlum St Oliver Bldg., Pittsb
Bethlehem Steel Co., Bethlehem, Pa.
Firth-Sterling Steel C McKeesport, Pa.
Jessop, Wm., & Sons 121 Varick St., New
Latrobe Electric Steel Latrobe, Pa.

STEEL (High Tensile)
Alan Wood Steel Co., Conshohocken, Pa.
Carnegie-Illinois Steel Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Inland Steel Co., 38 So. Dearborn St.
Jones & Laughlin Ste Jones & Laughlin Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.
Ryerson, Jos. T., & S 16th & Rockwell Sts.
Tennessee Coal, Iron & Brown Marx Bldg., Birmingham, Ala.
Youngstown Sheet & T Youngstown, O.

STEEL (Nitriding)
Allegheny Ludlum Stee Oliver Bldg., Pittsbu
Firth-Sterling Steel C McKeesport, Pa.

STEEL (Rustless)—See (Corrosion Resisting)

STEEL (Screw Stock)
American Steel & Wire Rockefeller Bldg., C
Bethlehem Steel Co Bethlehem, Pa.
Bliss & Laughlin, Inc.
Carnegie-Illinois Steel Pittsburgh-Chicago.
Jones & Laughlin Steel Jones & Laughlin Bld Pittsburgh, Pa.
Wisconsin Steel Co., 180 No. Michigan Ave

Stock)—Con.
roducts Co.,
Pa.
Corp., Dept. ST,

& Son, Inc.,
ell Sts., Chicago, Ill.
Steel Co.,

Steel Co.,
Bank Bldg.,

et & Tube Co., The,
O.

& Wire Co.,
dg., Cleveland, O.
n Steel Corp.,
hlin Bldg.,
a.
Co.,
Harlem River,
ity.

es)—See STEEL
sisting)

Copper Coated)
& Wire Co.,
dg., Cleveland, O.
The,
Conn.
onn.
Co., Warren, O.

Hot and Cold
ss)
um Steel Corp.,
Pittsburgh, Pa.
ing Mill Co., The,
).
& Wire Co.,
dg., Cleveland, O.
& Stamping Plant,
W.) Bridgeport, Conn.
Co., The.

el Co.,
a.
Steel Corp.,
icago.
Co.,
Calif.
Steel Co.,
Pa.
eel Corp.,
it, Mich.

orn St., Chicago, Ill.
z Sons, Inc.,
., New York City.
lin Steel Corp.,
hlin Bldg.,
a.
Co.,
St. Louis, Mo.
Corp., Dept. ST,
).
T., & Son, Inc.,
ell Sts., Chicago, Ill.
s, The,
Conn.
Conn.
Corp., Carnegie, Pa.
Iron & Railroad Co.
Bldg.,
Ala.
o., Warren, O.
Co.,
Harlem River,
ity.
Co., Weirton, W. Va
er Steel Co.,
., New York City.
Co.,
gan Ave., Chicago, Ill.

Tin Coated)
& Wire Co.,
dg., Cleveland, O.
Co., The, Warren, O
e Co., 118th St. &
., New York City.

Zinc Coated)
& Wire Co.,
dg., Cleveland, O.
o., Warren, O.
e Co., 118th St. &
r, New York City.

tural)
less)
e Co.,
Pittsburgh, Pa.
Works, 22nd St. and
ve., Philadelphia, Pa.
l Co.,
a.
Steel Corp.,
icago.
Co.,
o, Calif.

Inland Steel Co.,
38 So. Dearborn St., Chicago, Ill.
*Jones & Laughlin Steel Corp.,
Jones & Laughlin Bldg.,
Pittsburgh, Pa.
*Levinson Steel Co., The,
39 Pride St., Pittsburgh, Pa.
*Republic Steel Corp., Dept. ST,
Cleveland, O.
Ryerson, Jos. T., & Son, Inc.,
16th & Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co.,
Brown Marx Bldg.,
Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Wisconsin Steel Co.,
180 No. Michigan Ave., Chicago, Ill.
Youngstown Sheet & Tube Co., The,
Youngstown, O.

STEEL (Tool)

Allegheny Ludlum Steel Corp.,
Oliver Bldg., Pittsburgh, Pa.
Bethlehem Steel Co.,
Bethlehem, Pa.
Darwin & Milner, Inc.,
1260 W. 4th St., Cleveland, O.
Firth-Sterling Steel Co.,
McKeesport, Pa.
Jessop, Wm., & Sons Co.,
121 Varick St., New York City.
Kidd Drawn Steel Co.,
Aliquippa, Pa.
Latrobe Electric Steel Co.,
Latrobe, Pa.
Midvale Co., The, Nicetown,
Philadelphia, Pa.
Republic Steel Corp., Dept. ST,
Cleveland, O.
Ryerson, Jos. T., & Son, Inc.,
16th & Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co.,
Brown Marx Bldg.,
Birmingham, Ala.

STEEL BUILDINGS—See BRIDGES, BUILDINGS, ETC.

STEEL DOORS & SHUTTERS—See DOORS & SHUTTERS

STEEL FABRICATORS—See BRIDGES, BUILDINGS, ETC.

STEEL PLATE CONSTRUCTION

American Bridge Co.,
Frick Bldg., Pittsburgh, Pa.
Bartlett-Hayward Div.,
The Koppers Co., Baltimore, Md.
Belmont Iron Works,
22nd St., and Washington Ave.,
Philadelphia, Pa.
Bethlehem Steel Co.,
Bethlehem, Pa.
Brown Instrument Div. of Minneapolis Honeywell Regulator Co., 4462 Wayne Ave.,
Philadelphia, Pa.
Federal Shipbuilding & Dry Dock Co., Kearney, N. J.
Jones & Laughlin Steel Corp.,
Jones & Laughlin Bldg.,
Pittsburgh, Pa.
Petroleum Iron Works Co.,
Sharon, Pa.
Western Gas Div., The Koppers Co.,
Fort Wayne, Ind.

STELLITE

Haynes Stellite Co., Harrison and Lindsay Sts., Kokomo, Ind.

STOKERS

Babcock & Wilcox Co., The,
19 Rector St., New York City.

STOPPERS (Cinder Notch)

Bailey, Wm. M., Co.,
702 Magee Bldg., Pittsburgh, Pa
Brosius, Edgar E., Inc.,
Sharpsburg, Pa.

STORAGE BATTERIES—See BATTERIES (Storage)

STRAIGHTENING MACHINERY

Aetna-Standard Engineering Co., The, Youngstown, O.
Cleveland Punch & Shear Works, The,
3917 St. Clair Ave., Cleveland, O.
Lewis Foundry & Machine Co.,
P. O. Box 1586, Pittsburgh, Pa.
Lewis Machine Co.,
3438 E. 76th St., Cleveland, O.
Logeman Brothers Co.,
3126 Burleigh St., Milwaukee, Wis.
Medart Co., The,
3500 de Kalb St., St. Louis, Mo.
Shuster, F. B., Co., The,
New Haven, Conn.
Sutton Engineering Co.,
Park Bldg., Pittsburgh, Pa.

SULPHURIC ACID

Cleveland-Cliffs Iron Co., Union Commerce Bldg., Cleveland, O.
New Jersey Zinc Co.,
160 Front St., New York City.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia, Pa.

SWITCHES (Electric)

Electric Controller & Mfg. Co.,
2698 E. 79th St., Cleveland, O.
General Electric Co.,
Schenectady, N. Y.
General Electric Vapor Lamp Co.,
885 Adams St., Hoboken, N. J.

TACHOMETERS

Brown Instrument Div. of Minneapolis Honeywell Regulator Co.,
4462 Wayne Ave., Philadelphia, Pa.
Foxboro Co., The, 118 Neponset Ave., Foxboro, Mass.

TANKS (Pickling)

American Hard Rubber Co.,
11 Mercer St., New York City.
Goodyear Tire & Rubber Co.,
Akron, O.
United States Rubber Co.,
1790 Broadway, New York City.

TANKS (Quenching, Automatic)

American Gas Furnace Co.,
Elizabeth, N. J.

TANKS (Storage, Pressure, Riveted, Welded)

American Bridge Co.,
Frick Bldg., Pittsburgh, Pa.
Bartlett-Hayward Div., The Koppers Co., Baltimore, Md.
Bethlehem Steel Co.,
Bethlehem, Pa.
Petroleum Iron Works Co.,
Sharon, Pa.
Pressed Steel Tank Co.,
Milwaukee, Wis.
Western Gas Div., The Koppers Co., Fort Wayne, Ind.

TANKS—WOOD OR STEEL (Rubber or Lead Lined)

American Hard Rubber Co.,
11 Mercer St., New York City.
Goodyear Tire & Rubber Co.,
Akron, O.
United States Rubber Co.,
1790 Broadway, New York City.

TAPS AND DIES

Greenfield Tap & Die Corp.,
Greenfield, Mass.
Landis Machine Co., Inc.,
Waynesboro, Pa.

TERNE PLATE—See TIN PLATE

TESTING MACHINES (Moisture Tester)

Alpha-Lux Co., Inc.,
192 Front St., New York City.

THERMOMETERS

Brown Isntrument Div. of Minneapolis Honeywell Regulator Co., 4462 Wayne Ave.,
Philadelphia, Pa.
Foxboro Co., The, 118 Neponset Ave., Foxboro, Mass.
Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.

THREAD CUTTING TOOLS

Landis Machine Co., Inc.,
Waynesboro, Pa.

TIE PLATES

Bethlehem Steel Co.,
Bethlehem, Pa.
Carnegie-Illinois Steel Corp.,
Pittsburgh-Chicago.
Columbia Steel Co.,
San Francisco, Calif.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Republic Steel Corp., Dept. ST,
Cleveland, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg.,
Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.

TIN PLATE

Bethlehem Steel Co.,
Bethlehem, Pa.
Carnegie-Illinois Steel Corp.,
Pittsburgh-Chicago.
Columbia Steel Co.,
San Francisco, Calif.
Granite City Steel Co.,
Granite City, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp.,
Jones & Laughlin Bldg.,
Pittsburgh, Pa.
Republic Steel Corp., Dept. ST,
Cleveland, O.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., The,
Youngstown, O.

TIN PLATE MACHINERY

Aetna-Standard Engineering Co., The, Youngstown, O.
Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore, Md.
Wean Engineering Co., Warren, O.

TONGS (Rail Handling)

Cullen-Friestedt Co., 1308 Kilbourn Ave., Chicago, Ill.

TOOL BITS (High Speed)

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
Firth-Sterling Steel Co.,
McKeesport, Pa.
Haynes Stellite Co., Harrison and Lindsay Sts., Kokomo, Ind.

TOOLS (Pneumatic)

Cleveland Punch & Shear Works,
3917 St. Clair Ave., Cleveland, O.
Ingersoll-Rand Co.,
11 Broadway, New York City.

TOOLS (Precision, Lathe, Metal Cutting, etc.)

McKenna Metals Co.,
Steel Ave., Latrobe, Pa.

TOOLS (Tipped, Carbide)

McKenna Metals Co.,
Steel Ave., Latrobe, Pa.

TORCHES AND BURNERS (Acetylene, Blow, Oxy-Acetylene)

Air Reduction Sales Co.,
60 E. 42nd St., New York City.
Linde Air Products Co., The,
30 E. 42nd St., New York City.
National Cylinder Gas Co.,
205 W. Wacker Dr., Chicago, Ill.

TORCHES AND BURNERS (Air—Gas)

American Gas Furnace Co.,
Elizabeth, N. J.

TOWERS (Transmission)

American Bridge Co.,
Frick Bldg., Pittsburgh, Pa.
Bethlehem Steel Co.,
Bethlehem, Pa.

TRACK ACCESSORIES

Bethlehem Steel Co.,
Bethlehem, Pa.
Carnegie-Illinois Steel Corp.,
Pittsburgh-Chicago.
Columbia Steel Co.,
San Francisco, Calif.
Foster, L. B., Co., Inc.,
P. O. Box 1647, Pittsburgh, Pa.
Jones & Laughlin Steel Corp.,
Jones & Laughlin Bldg.,
Pittsburgh, Pa.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg.,
Birmingham, Ala.

TRACK BOLTS

Bethlehem Steel Co.,
Bethlehem, Pa.
Carnegie-Illinois Steel Corp.,
Pittsburgh-Chicago.
Columbia Steel Co.,
San Francisco, Calif.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg.,
Birmingham, Ala.
Youngstown Sheet & Tube Co., The,
Youngstown, O.

TRAILERS (Arch-Girder)

Yale & Towne Mfg. Co.,
4530 Tacony St., Philadelphia, Pa.

TRAMRAILS

American MonoRail Co., The,
13107 Athens Ave., Cleveland, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co.,
Wickliffe, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Yale & Towne Mfg. Co.,
4530 Tacony St., Philadelphia, Pa.

TRANSFORMERS

Wagner Electric Corp.,
4904 Baum Blvd., Pittsburgh, Pa.

TRANSMISSIONS VARIABLE SPEED

Link-Belt Co., 220 S. Belmont Ave., Indianapolis, Ind.

TRAPS (Steam and Radiator)
Johns-Manville Corp., 22 E. 40th St., New York City.

TREADS (Safety)
Alan Wood Steel Co., Conshohocken, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Dravo Corp., Machinery Div., Dravo Bldg., Pittsburgh, Pa.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Tri-Lok Co., Dravo Bldg., Pittsburgh, Pa.

TROLLEYS
American MonoRail Co., The, 13107 Athens Ave., Cleveland, O.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.

TRUCKS AND TRACTORS (Electric Industrial)
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
Elwell-Parker Electric Co., The, 4501 St. Clair Ave., Cleveland, O.
Towmotor, Inc., 1247 E. 152nd St., Cleveland, O.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.

TRUCKS AND TRACTORS (Gasoline Industrial)
Clark Tructractor Div., Clark Equipment Co., Battle Creek, Mich.
Elwell-Parker Electric Co., The, 4501 St. Clair Ave., Cleveland, O.
Towmotor, Inc., 1247 E. 152nd St., Cleveland, O.

TRUCKS (Dump-Industrial)
Towmotor, Inc., 1247 E. 152nd St., Cleveland, O.

TRUCKS (Hydraulic Lift)
Towmotor, Inc., 1247 E. 152nd St., Cleveland, O.

TRUCKS (Lift)
Clark Tructractor Div., Clark Equipment Co., Battle Creek, Mich.
Elwell-Parker Electric Co., The, 4501 St. Clair Ave., Cleveland, O.
Towmotor, Inc., 1247 E. 152nd St., Cleveland, O.
Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.

TUBE MILL EQUIPMENT
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh, Pa.

TUBE MILL MACHINERY
Aetna-Standard Engineering Co., The, Youngstown, O.

TUBES (Boiler)
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Pittsburgh Steel Co., Grant Bldg., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Standard Tube Co., The, 15020 Woodward Ave., Detroit, Mich.
Timken Steel & Tube Co., Canton, O.
Youngstown Sheet & Tube Co., Youngstown, O.

TUBES (Brass, Bronze, Copper, Nickel Silver)
American Brass Co., The, American Metal Hose Branch, Waterbury, Conn.
Bridgeport Brass Co., Bridgeport, Conn.

TUBING (Alloy Steel) (*Also Stainless)
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
*Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Columbia Steel Co., San Francisco, Calif.
*National Tube Co., Frick Bldg., Pittsburgh, Pa.
Pittsburgh Steel Co., Grant Bldg., Pittsburgh, Pa.
Timken Steel & Tube Co., Canton, O.

TUBING (Cold Drawn Seamless Steel)
Columbia Steel Co., San Francisco, Calif.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Pittsburgh Steel Co., Grant Bldg., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Standard Tube Co., The, 15020 Woodward Ave., Detroit, Mich.
Timken Steel & Tube Co., Canton, O.

TUBING (Copper, Brass, Aluminum)
Bundy Tubing Co., 10951 Hern Ave., Detroit, Mich.
Shenango-Penn Mold Co., Dover, O.

TUBING (Phosphor Bronze)
American Brass Co., The, American Metal Hose Branch, Waterbury, Conn.

TUBING (Seamless Flexible Metal)
American Brass Co., The, American Metal Hose Branch, Waterbury, Conn.

TUBING (Welded Steel)
Bundy Tubing Co., 10951 Hern Ave., Detroit, Mich.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Standard Tube Co., The, 15020 Woodward Ave., Detroit, Mich.
Youngstown Sheet & Tube Co., The, Youngstown, O.

TUMBLING BARRELS (Coke Testing)
Brosius, Edgar E., Inc., Sharpsburg, Pa.

TUNGSTEN CARBIDE
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
Haynes Stellite Co., Harrison and Lindsay Sts., Kokomo, Ind.

TUNGSTEN CARBIDE (Tools and Dies)
Firth-Sterling Steel Co., McKeesport, Pa.

TUNGSTEN METAL AND ALLOYS
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.

TURBINES (Steam)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

TURBO BLOWERS—See BLOWERS

TURNTABLES
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.

TURRET LATHES—See LATHES (Turret)

TWIST DRILLS
Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland, O.
Greenfield Tap & Die Corp., Greenfield, Mass.

VACUUM CLEANERS
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.

VALVES (Blast Furnace)
Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh, Pa.
Brosius, Edgar E., Inc., Sharpsburg, Pa.

VALVES (Control—Air and Hydraulic)
Foxboro Co., The, 118 Neponset Ave., Foxboro, Mass.
Hannifin Mfg. Co., 621-631 So. Kolmar Ave., Chicago, Ill.

VALVES (Electrically Operated)
Foxboro Co., The, 118 Neponset Ave., Foxboro, Mass.

VALVES (Gas and Air Reversing)
Blaw-Knox Co., Blawnox, Pa.
Wilputte Coke Oven Corp., 570 Lexington Ave., New York City.

VALVES (Gate)
American Chain & Cable Co., Bridgeport, Conn.
Bartlett-Hayward Div., The Koppers Co., Baltimore, Md.
Crane Co., The, 836 So. Michigan Blvd., Chicago, Ill.
Western Gas Div., The Koppers Co., Fort Wayne, Ind.

VALVES (Gate—Rubber Lined)
American Hard Rubber Co., 11 Mercer St., New York City.

VALVES (Hydraulic)
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Vickers, Inc., 1400 Oakman Blvd., Detroit, Mich.
Wood, R. D., 400 Chestnut St., Philadelphia, Pa.

VALVES (Hydraulic De-Scaling)
Hunt, C. B., & Son, Salem, O.

VALVES (Steam and Water)
American Chain & Cable Co., Bridgeport, Conn.

VALVES AND FITTINGS—See PIPE FITTINGS

VANADIUM
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.

VIADUCTS (Steel)—See BRIDGES, ETC.

WALKWAYS—See FLOORING—STEEL

WASHERS (Iron and Steel)
Hubbard, M. D., Spring Co., 613 Central Ave., Pontiac, Mich.
Peoria Malleable Castings Co., Peoria, Ill.

WELDERS (Electric—Arc, Spot, Seam, Flash, Butt, Automatic Projection, Hydromatic, Etc.)
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Lincoln Electric Co., The, Cleveland O., Dept. 20-5.
Thompson-Gibb Electric Welding Co., Lynn, Mass.
Welding Equipment & Supply Co., 2720 E. Grand Blvd., Detroit, Mich.

WELDING
Bartlett-Hayward Div., The Koppers Co., Baltimore, Md.
Budd, Edw. G., Mfg. Co., 25th St. & Huntington Park Ave., Philadelphia, Pa.
Lincoln Electric Co., The, Cleveland O., Dept. 20-5.
Western Gas Div., The Koppers Co., Fort Wayne. Ind.

WELDING AND CUTTING APPARATUS AND SUPPLIES (Electric)
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Lincoln Electric Co., The, Cleveland O., Dept. 20-5.
National Cylinder Gas Co., 205 W. Wacker Dr., Chicago, Ill.
Thompson-Gibb Electric Welding Co., Lynn, Mass.
Wilson Welder & Metals Co., 60 E. 42nd St., New York City.
Welding Equipment & Supply Co., 2720 E. Grand Blvd., Detroit, Mich.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

WELDING AND CUTTING APPARATUS AND SUPPLIES (Oxy-Acetylene)
Air Reduction Sales Co., 60 E. 42nd St., New York City.
Linde Air Products Co., The, 30 E. 42nd St., New York City.
National Cylinder Gas Co., 205 W. Wacker Dr., Chicago, Ill.
Welding Equipment & Supply Co., 2720 E. Grand Blvd., Detroit, Mich.

WELDING RODS (Alloys)
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Lincoln Electric Co., The, Cleveland O., Dept. 20-5.
Maurath, Inc., 7311 Union Ave., Cleveland, O.
Metal & Thermit Corp., 120 Broadway, New York City.
Welding Equipment & Supply Co., 2720 E. Grand Blvd., Detroit, Mich.

WELDING RODS (Bronze)
Titan Metal Mfg. Co., Bellefonte, Pa.
Welding Equipment & Supply Co., 2720 E. Grand Blvd., Detroit, Mich.

WELDING RODS (...)
Air Reduction Sales ... 42nd St., New Yo...
American Brass Co ... 25 Broadway, Ne...
American Steel & W... Rockefeller Bldg.
Bridgeport Brass C... Bridgeport, Conn.
Harnischfeger Corp., National Ave., M...
Lincoln Electric Co... Cleveland O., Dep...
Linde Air Products ... 30 E. 42nd St., N...
Maurath, Inc., 7311 ... Cleveland, O.
Metal & Thermit C... 120 Broadway, N...
Page Steel & Wire ... Monessen, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Ryerson, Jos. T., & ... and Rockwell Sts.
Washburn Wire Co..., Phillipsdale, R. I.
Welding Equipment & ... 2720 E. Grand Blvd.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer St... 41 E. 42nd St., N...
Wilson Welder & Me... 60 East 42nd St.
Youngstown Sheet & ... Youngstown, O.

WHEELS (Car and ...)
Bethlehem Steel Co... Bethlehem, Pa.
Carnegie-Illinois Stee... Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Ca...
Midvale Co., The, N... Philadelphia, Pa.
Standard Steel Works ... Paschall P. O., Ph...

WHEELS (Track)
National-Erie Corp.

WINCHES (Electric)
American Engineering, 2484 Aramingo Av... Philadelphia, Pa.
Shepard Niles Crane ... Montour Falls, N...

WIRE (Alloy Steel) (*Also Stainless)
*Allegheny Ludlum S... Oliver Bldg., Pitts...
*American Steel & W... Rockefeller Bldg.,...
Columbia Steel Co., San Francisco, Ca...
Firth-Sterling Steel ... McKeesport, Pa.
Page Steel & Wire ... Monessen, Pa.
*Pittsburgh Steel Co ... Pittsburgh, Pa.
*Republic Steel Corp ... Dept. ST, Cleveland...
Ryerson, Jos. T., & ... and Rockwell Sts.
Wickwire Spencer St... 41 E. 42nd St., Ne...

WIRE (Annealed, P... Galvanized)
American Steel & Wi... Rockefeller Bldg., C...
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Ca...
Page Steel & Wire ... Monessen, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST, Clevelan...
Tennessee Coal, Iron ... Co., Brown-Marx ... Birmingham, Ala.
Wickwire Brothers, 189 Main St., Cort...
Wickwire Spencer Ste... 41 E. 42nd St., Ne...
Youngstown Sheet & T... Youngstown, O.

WIRE (Barb)
Bethlehem Steel Co., Bethlehem, Pa.
Pittsburgh Steel Co., Grant Bldg., Pittsbu...
Tennessee Coal, Iron ... Co., Brown-Marx B... Birmingham, Ala.
Youngstown Sheet & Youngstown, O.

Columbia Steel Co.,
San Francisco, Calif.
Firth-Sterling Steel Co.,
McKeesport, Pa.
Hubbard, M. D., Spring Co.,
613 Central Ave., Pontiac, Mich.

WIRE MILL EQUIPMENT

Lewis Foundry & Machine Co.,
P. O. Box 1586, Pittsburgh, Pa.
Lewis Machine Co.,
3438 E. 76th St., Cleveland, O.
Morgan Construction Co.,
Worcester, Mass.
Shuster, F. B., Co., The,
New Haven, Conn.
Sleeper & Hartley, Inc.,
Worcester, Mass.

WIRE NAILS—See NAILS

WIRE PRODUCTS
(*Also Stainless)

*American Steel & Wire Co.,
Rockefeller Bldg., Cleveland, O.
Hubbard, M. D., Spring Co.,
613 Central Ave., Pontiac, Mich.
*Jones & Laughlin Steel Corp.,
Jones & Laughlin Bldg.,
Pittsburgh, Pa.
Lacledg Steel Co.,
Arcade Bldg., St. Louis, Mo.
Leschen, A., & Sons Rope Co.,
5909 Kennerly Ave.,
St. Louis, Mo.
Page Steel & Wire Co.,
Monessen, Pa.
Pittsburgh Steel Co.,
Grant Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST,
Cleveland, O.
Tennessee Coal, Iron & Railroad
Co., Brown-Marx Bldg.,
Birmingham, Ala.
Washburn Wire Co.,
118th St. and Harlem River,
New York City.
Wickwire Brothers,
189 Main St., Cortland, N. Y.
Wickwire Spencer Steel Co.,
41 E. 42nd St., New York City.
Youngstown Sheet & Tube Co., The,
Youngstown, O.

WIRE ROPE AND FITTINGS
(*Also Stainless)

*American Steel & Wire Co.,
Rockefeller Bldg., Cleveland, O.
Bethlehem Steel Co.,
Bethlehem, Pa.
Jones & Laughlin Steel Corp.,
Jones & Laughlin Bldg.,
Pittsburgh, Pa.
Leschen, A., & Sons Rope Co.,
5909 Kennerly Ave.,
St. Louis, Mo.
Page Steel & Wire Co.,
Monessen, Pa.
Wickwire Spencer Steel Co.,
41 E. 42nd St., New York City.

WIRE ROPE SLINGS

American Steel & Wire Co.,
Rockefeller Bldg., Cleveland, O.
Leschen, A., & Sons Rope Co.,
5909 Kennerly Ave.,
St. Louis, Mo.

WIRE STRAIGHTENING AND CUTTING MACHINERY

Lewis Foundry & Machine Co.,
P. O. Box 1586, Pittsburgh, Pa.
Lewis Machine Co.,
3438 E. 76th St., Cleveland, O.
Shuster, F. B., Co., The,
New Haven, Conn.
Sleeper & Hartley, Inc.,
Worcester, Mass.

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ZINC SLABS (High Grade)

St. Joseph Lead Co.,
250 Park Ave., New York City.

ZINC SLABS (Spelter)

New Jersey Zinc Co.,
160 Front St., New York City.

ZIRCONIUM METAL AND ALLOYS

Electro Metallurgical Sales Co.,
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ADVERTISING INDEX

Where-to-Buy Products Index carried in first issue of month.

Page

A

Abrasive Co., Division of Simonds Saw & Steel Co. —
Acme Galvanizing, Inc. —
Acme Steel & Malleable Iron Works. . —
Aetna-Standard Engineering Co. . . . . —
Ahlberg Bearing Co. —
Air Reduction Sales Co. —
Ajax Electric Co., Inc. —
Ajax Electric Furnace Corp. —
Ajax Electrothermic Corp. —
Ajax Metal Co., The —
Alan Wood Steel Co. —
Allegheny Ludlum Steel Corp. —
Allen-Bradley Co. —
Alliance Machine Co., The —
Allis-Chalmers Mfg. Co. —
Alpha-Lux Co., Inc., The —
American Brass Co., The —
American Bridge Co. —
American Chain & Cable Co., Inc., Ford Chain Block Division. . . . . —
American Chain & Cable Co., Inc., Page Steel & Wire Division. 96
American Chemical Paint Co. 123
American Engineering Co. —
American Gas Association —
American Gas Furnace Co. —
American Hammered Piston Ring Division of Koppers Co. —
American Hollow Boring Co. —
American Hot Dip Galvanizers' Association —
American Metal Hose Branch of The American Brass Co. —
American Monorail Co. —
American Pulverizer Co. 97
American Rolling Mill Co., The. . . . . —
American Screw Co. —
American Shear Knife Co. —
American Steel & Wire Co. —
American Tinning & Galvanizing Co. . . —
Amsler-Morton Co., The —
Anaconda Wire & Cable Co. —
Andrews Steel Co. —
Apollo Steel Co. —
Armstrong Cork Co. —
Atlantic Stamping Co. —
Atlas Car & Mfg. Co. 90
Atlas Drop Forge Co. 119

B

Babcock & Wilcox Co. —
Bailey, Wm. M., Co. —
Bantam Bearings Corp. —
Barber-Colman Co. —
Barnes, Wallace, Co., The, Division of Associated Spring Corporation. . . . . —
Bartlett Hayward Division of Koppers Co. —
Bay City Forge Co. —
Bellevue-Stratford Hotel —
Belmont Iron Works 117
Benjamin Franklin Hotel —
Berger Manufacturing Div., Republic Steel Corp. —
Bethlehem Steel Co. 3
Birdsboro Steel Foundry & Machine Co. —
Bissett Steel Co., The —
Blaw-Knox Co. —
Blaw-Knox Division, Blaw-Knox Co. . . —
Blaw-Knox Sprinkler Div., Blaw-Knox Co. —
Bliss & Laughlin, Inc. —
Brassert, H. A., & Co. 111
Bridgeport Brass Co. 79, 80
Brooke, E. & G., Iron Co. 117
Brookmire Corporation —
Boston Tow Boat Co. —
Brosius, Edgar E., Inc. —
Brown & Sharpe Mfg. Co. 69
Brown Instrument Co., The —
Buffalo Galvanizing & Tinning Works, Inc. —

Page

Bullard Co., The —
Bundy Tubing Co. —

C

Cadman, A. W., Mfg. Co. 124
Carborundum Co., The —
Carnegie-Illinois Steel Corp. —
Carter Hotel —
Cattie, Joseph P., & Bros., Inc. —
Chain Belt Co. —
Chain Products Co. —
Chandler Products Co. —
Chicago Electric Co. 125
Chicago Perforating Co. —
Chicago Rawhide Mfg. Co. —
Cincinnati Grinders, Inc. —
Cincinnati Milling Machine Co. —
Cincinnati Shaper Co., The —
Clark Controller Co. —
Clark Tructractor, Div. Clark Equipment Co. —
Cleveland Cap Screw Co. —
Cleveland-Cliffs Iron Co. —
Cleveland Crane & Engineering Co. . . —
Cleveland Hotel 99
Cleveland Punch & Shear Works Co., The 10
Cleveland Tramrail Division, Cleveland Crane & Engineering Co. —
Cleveland Twist Drill Co. 59
Cleveland Worm & Gear Co., The. . . . —
Climax Molybdenum Co. 28
Colonial Steel Co. —
Columbia Steel Co. —
Columbian Steel Tank Co. —
Columbus Die, Tool & Machine Co. . . . 115
Continental Roll & Steel Foundry Co. —
Continental Screw Co. —
Corbin Screw Corp. —
Cowles Tool Co. —
Crane Co. —
Criswell, James, Co. —
Crosby Co., The 119
Cullen-Friestedt Co. —
Curtis Pneumatic Machinery Co. . . . . —
Cyclone Fence Co. —

D

Damascus Steel Casting Co. —
Darwin & Milner, Inc. 117
Davis Brake Beam Co. 119
Detroit Leland Hotel 100
Diamond Expansion Bolt Co., Inc. . . . . —
Dravo Corp., Machinery Division. . . . . —
Duer Spring & Mfg. Co. 109

E

Eastern Gas & Fuel Associates —
Edison, Thomas A., Inc. —
Electric Controller & Mfg. Co. . . . . —
Electric Furnace Co., The —
Electric Storage Battery Co. 55
Electrochemical Processes Division Blaw-Knox Co. —
Electro Metallurgical Co. 12
Elwell-Parker Electric Co. —
Engineering & Construction Division of Koppers Co. 60, 61
Enterprise Galvanizing Co. —
Erdle Perforating Co. —
Erie Foundry Co. —
Eureka Fire Brick Works 123
Excelsior Tool & Machine Co. 115

F

Fafnir Bearing Co. —
Fairbanks, Morse & Co. —
Fanner Mfg. Co., Inc. —
Farrel-Birmingham Co., Inc. —
Farval Corp., The —
Federal Shipbuilding & Dry Dock Co. —
Finn, John, Metal Works —
Firth-Sterling Steel Co. —
Fitzsimons Co., The —

Flinn & Dreffein Co. . . .
Ford Chain Block Divisi
can Chain & Cable Co.,
Foster, L. B., Inc. . . . . .
Foxboro Co., The . . . . .

G

Gardner Displays . . . . . .
Gas & Coke Division of K
General Electric Co. . . . . .
General Electric Co., I
Lamp Dept. . . . . .
General Electric Vapor I
Goodyear Tire & Rubber
Gordon Lubricator Divis
Knox Co. . . . . .
Granite City Steel Co. . .
Grant Gear Works . . . .
Great Lakes Steel Corp.
Greenfield Tap & Die Corp
Gregory, Thomas, Galvan.
Gulf Oil Corporation . .
Gulf Refining Co. . . . . .

H

Hagan Corporation, The
Hagan, George J., Co. .
Hallden Machine Co., The
Hanlon-Gregory Galvanizi
Hanna Furnace Corp.
Hannifin Mfg. Co. . . . . .
Harnischfeger Corp. . .
Harrington & King Perfo
Hays Corp., The . . .
Heald Machine Co., The
Helmer-Staley, Inc. . . .
Heppenstall Co. . . . . .
Hevi-Duty Electric Co. . .
Hilliard Corp., The . . .
Hillside Fluor Spar Mines
Hindley Mfg. Co. . . . . .
Hodell Chain Co., The . .
Horsburgh & Scott Co.
Houghton, E. F., & Co.
Hubbard, M. D., Spring C
Hunt, C. B., & Son . . . .
Hunt, C. H. . . . . .
Huther Bros. Saw Mfg. C
Hyatt Bearings Division.
tors Sales Corporation
Hyde Park Foundry &

I

Independent Galvanizing C
Industrial Brownhoist Co
Ingersoll-Rand Co. . . . .
Inland Steel Co. . . . . .
International Derrick & Eq
International Nickel Co.,
Irwin, H. G., Lumber Co.

J

Jackson Iron & Steel Co.,
James, D. O., Mfg. Co.
J-B Engineering Sales Co.
Jessop, Wm., & Sons, Inc.
Johns-Manville Corp.
Jones & Laughlin Steel Co
Jones, W. A., Foundry &
Joslyn Co. of California
Joslyn Mfg. & Supply Co.

K

Kardong Brothers, Inc. . .
Keagler Brick Co., The . .
Kemp, C. M., Mfg. Co. . .
Kidd Drawn Steel Co. . . .
Kidde, Walter, & Co. . . .
King Fifth Wheel Co. . .
Kinnear Manufacturing Co.
Koppers Co. . . . . .
Koppers Coal Co., The . .

ADVERTISING INDEX

Where-to-Buy Products Index carried in first issue of month.

Page

veur Co. ... —
Brother, Inc. ... —
... 100
Co. ... —

L

Co. ... —
eable Co. ... —
ions Co., The ... —
e Co., Inc. ... 8
o. ... —
ic Steel Co. ... 117
Machine Tool Co., The —
rup Co. ... —
., Inc. ... 119
ural Steel Co. ... —
Sons Rope Co. ... —
Co., The ... 117
& Machine Division of
Co. ... —
Co., The ... 109
ic Co. ... —
ucts Co., The ... —
wis B. ... —
... 95
ering Corp. ... 111
s. Co. ... 87

Mc

... —
e Co. ... —
ls Co. ... 117

M

mphill Co. ... —
n Machine Co. ... —
Dock Co., The ... —
eyer Co. ... —
... —
he ... —
al Corp. ... —
e Co. ... —
mit Corp. ... —
The ... 6
ng Mill Corp. ... —
Products Co. ... —
Co. ... —
ruction Co. ... —
eering Co. ... —
Co. ... —
Works ... —
hip Co. ... —

N

Steel Co. ... —
ing Metals Corp. ... 123
Corp. ... —
& Ordnance Co. ... —
Co. ... 7
er & Creosoting Co. ... —
& Foundry Co. ... 107
& Mfg. Co. ... —
Corp. ... 4, 101
hone Supply Co., Inc. ... —
Co. ... —
e, Division General Mo-
... —
Coal & Coke Co. ... —
linc Co. ... 31
ew Jersey Lubricant Co. 47
hine & Tool Works ... —
Products Div., Republic
... —
ann Bearings Corp. ... —
he ... —

O

Mfg. Co. ... 109
Toys Corp. ... —
ive Crane Co. ... 115
ndry Co., The ... —

Page

Oil Well Supply Co. ... —
Oxweld Acetylene Co. ... —

P

Page Steel & Wire Division of American Chain & Cable Co., Inc. ... 96
Parker-Kalon Corp. ... —
Parkin, Wm. M., Co. ... —
Peabody Engineering Corp. ... 77
Penn Galvanizing Co. ... —
Pennsylvania Industrial Engineers ... 111
Pennsylvania Salt Mfg. Co. ... —
Penola, Inc. ... —
Peoria Malleable Castings Co. ... 123
Perkins, B. F., & Son, Inc. ... —
Pheoll Mfg. Co. ... —
Philadelphia Gear Works ... —
Pittsburgh Crushed Steel Co. ... —
Pittsburgh Lectromelt Furnace Corp. 99
Pittsburgh Plate Glass Co. ... —
Pittsburgh Rolls Division of Blaw-Knox Co. ... —
Pittsburgh Steel Co. ... —
Poole Foundry & Machine Co. ... 102
Power Piping Corp. ... —
Pressed Steel Tank Co. ... —
Prest-O-Lite Co., Inc., The ... —
Progressive Mfg. Co. ... —
Pure Oil Co., The ... 124

R

Raymond Mfg. Co., Division of Associated Spring Corp. ... 109
Reliance Electric & Engineering Co. ... —
Republic Steel Corp. ... —
Research Corp. ... 24
Riverside Foundry & Galvanizing Co. —
Roper, Geo. D., Corp. ... 91
Ruemelin Mfg. Co. ... 107
Russell, Burdsall & Ward Bolt & Nut Co. ... —
Ryerson, Joseph T., & Son, Inc. ... 117

S

St. Joseph Lead Co. ... —
Salem Engineering Co. ... —
Samuel, Frank, & Co., Inc. ... 104
San Francisco Galvanizing Works ... —
Sanitary Tinning Co., The ... —
Scovill Mfg. Co. ... —
Scully Steel Products Co. ... —
Shafer Bearing Corporation ... —
Shaw-Box Crane & Hoist Division, Manning, Maxwell & Moore, Inc. ... 115
Shell Union Oil Corporation ... 53
Shenango Furnace Co., The ... —
Shenango-Penn Mold Co. ... —
Shepard Niles Crane & Hoist Corp. ... 93
Shuster, F. B., Co., The ... 107
Simonds Gear & Mfg. Co. ... 111
Simonds Saw & Steel Co. ... —
Sipe, James B., & Co. ... 124
SKF Industries, Inc. ... 73
Sleeper & Hartley, Inc. ... 107
Snyder, W. P., & Co. ... —
Socony-Vacuum Oil Co., Inc. ... —
Spowers, W. H., Jr. ... —
Standard Galvanizing Co. ... —
Standard Pressed Steel Co. ... —
Standard Steel Works Co. ... —
Standard Tube Co. ... 117
Stanley Works ... —
Stearns Magnetic Mfg. Co. ... —
Steel & Tubes, Inc. ... —
Steel Founders' Society of America ... —
Stewart Furnace Division, Chicago Flexible Shaft Co. ... 111
Stop-Rust Co., The ... —
Strong Steel Foundry Co. ... —
Sturtevant, B. F., Co. ... —
Sun Oil Co. ... —
Superior Steel Corp. ... —
Surface Combustion Corp. ... —
Syracuse Hotel ... —

Page

T

Tar & Chemical Division of Koppers Co. ... —
Tennessee Coal, Iron & Railroad Co. ... —
Thomas Machine Manufacturing Co. ... —
Thomas Steel Co., The ... —
Thomson-Gibb Electric Welding Co. ... —
Tide Water Associated Oil Co. ... —
Timken Roller Bearing Co. ... —
Timken Steel & Tube Division, The Timken Roller Bearing Co. ... —
Tinnerman Stove & Range Co. ... —
Toledo Stamping & Mfg. Co. ... —
Tomkins-Johnson Co. ... —
Torrington Co., The ... —
Towmotor, Inc. ... —
Tri-Lok Co. ... —
Truscon Steel Co. ... —

U

Union Carbide & Carbon Corp. ... 12
Union Carbide Sales Co. ... —
Union Drawn Steel Div., Republic Steel Corp. ... —
Union Steel Castings Co. ... —
United Engineering & Foundry Co. ... 66, 67
United States Rubber Co. ... —
United States Steel Corp., Subsidiaries —
American Bridge Co.
American Steel & Wire Co.
Carnegie-Illinois Steel Corp.
Columbia Steel Co.
Cyclone Fence Co.
Federal Shipbuilding & Dry Dock Co.
National Tube Co.
Oil Well Supply Co.
Scully Steel Products Co.
Tennessee Coal, Iron & Railroad Co.
United States Steel Products Co.
Universal Atlas Cement Co.
Virginia Bridge Co.
United States Steel Products Co. ... —
Universal Atlas Cement Co. ... —

V

Valley Mould & Iron Corp. ... —
Vickers, Inc. ... —
Virginia Bridge Co. ... —
Vulcan Steam Forging Co. ... —

W

Wagner Electric Corp. ... 98
Waldron, John, Corp. ... —
Washburn Wire Co. ... —
Washburn Wire Co., Inc. ... —
Wean Engineering Co., Inc. ... —
Weirton Steel Co. ... —
Welding Equipment & Supply Co. ... —
Wellman-Smith Owens Eng. Corp. Ltd. —
Western Precipitation Corp. ... 24
Westinghouse Electric & Mfg. Co. ... 50, 51
West Penn Machinery Co. ... 125
West Steel Casting Co. ... 123
Whitcomb Locomotive Co., The, Div., The Baldwin Locomotive Works ... —
Whitehead Stamping Co. ... 119
White Tar Co. of New Jersey, Inc. ... —
Wickwire Brothers ... 115
Wickwire Spencer Steel Co. ... —
Wilcox, Crittenden & Co., Inc. ... —
Wilson, Lee, Engineering Co. ... —
Wilson Welder & Metals Co., Inc. ... —
Wisconsin Steel Co. ... 128
Witt Cornice Co., The ... —
Wood Preserving Corp., The ... —
Worthington Pump & Machinery Corp. —
Worth Steel Co. ... —
Wyckoff Drawn Steel Co. ... —

Y

Yale & Towne Mfg. Co. ... —
Youngstown Alloy Casting Corp. ... —
Youngstown Sheet & Tube Co. ... —

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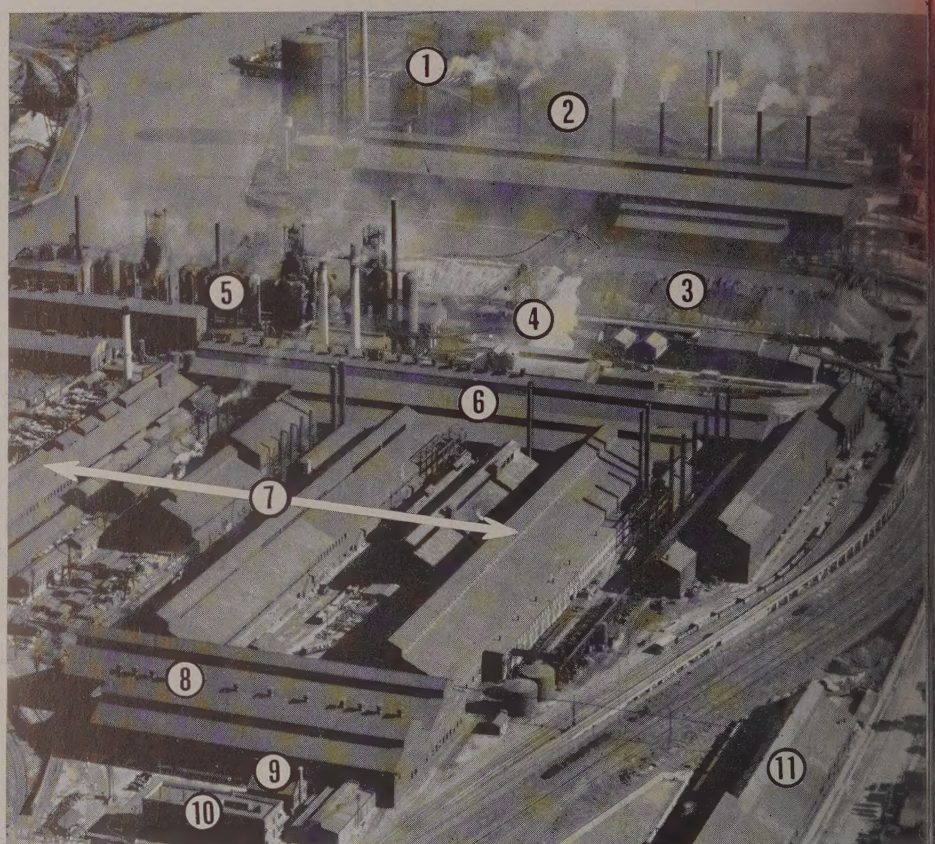

KEY—

1. Byproduct coke ovens.
2. Open hearth furnaces.
3. Ore docks.
4. Pig casting machines.
5. Blast furnaces.
6. Blooming mills.
7. Merchant and universal mills.
8. Storage building and shipping dept.
9. Metallurgy laboratory.
10. General offices.
11. Cold-drawn shafting mill.

Air view of Wisconsin Steel Company plant by Chicago Ae

WISCONSIN STEEL COMPANY is well equipped—from raw material source to finished product—to take care of your alloy and carbon steel and pig iron requirements. Our own ore mines, ore boats, coal mines, coking plants, blast furnaces, pig machines, open-hearth furnaces, blooming mill, bar mills, and cold-drawn mill enable us, as the keyed photograph above indicates, to control our output of high-quality products through every process of manufacture.

Our large staff of metallurgists and foundrymen serves the double purpose product quality high and rendering consultation service to our customers.

We invite users of alloy and carbon pig iron to write or phone us for comp mation concerning our products.

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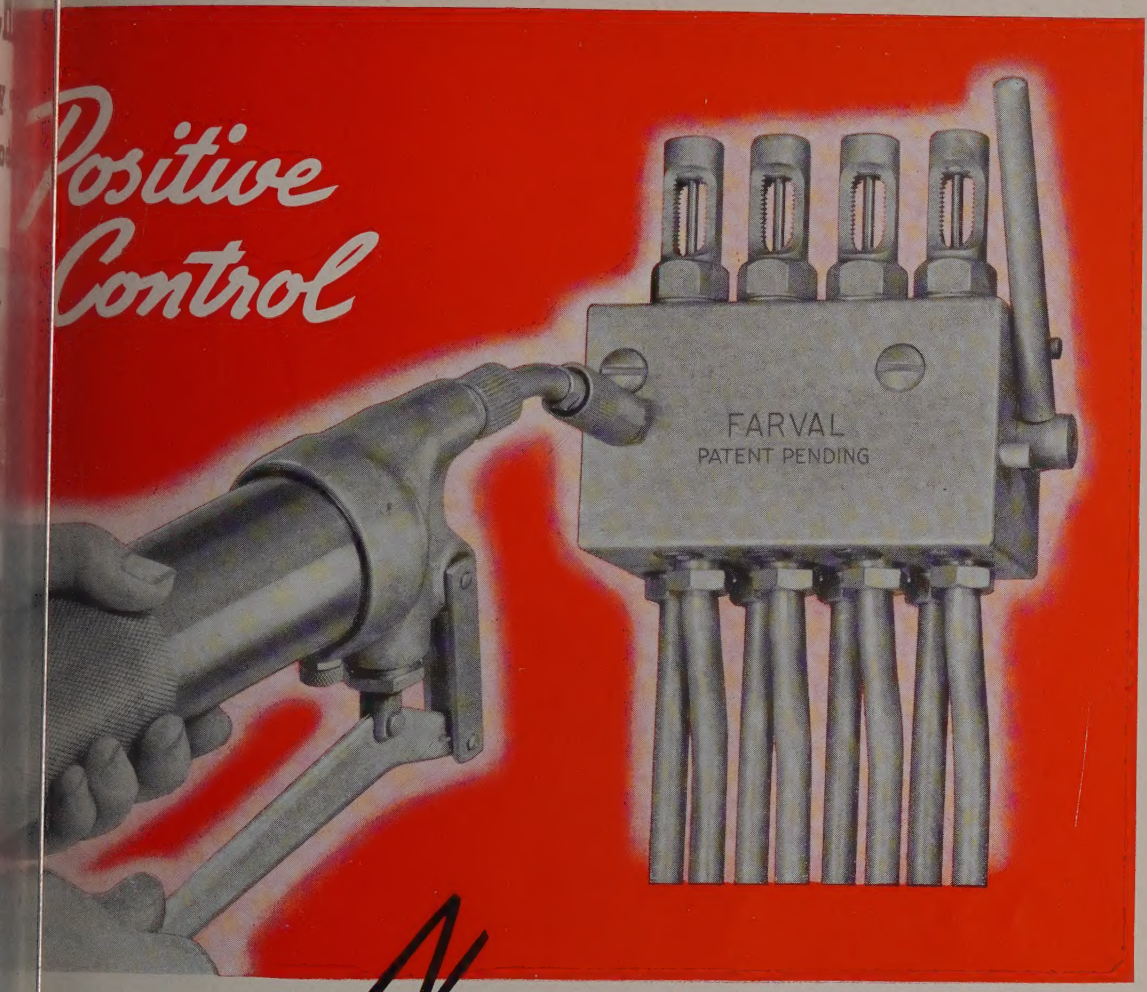
Alloy and Carbon Steel **Pig I**

Positive Control



. . . A *New* CENTRALIZED LUBRICANT MEASURING VALVE

positive control between your present e gun and your bearings.

ontinue to guess as to how much lubricant) is delivered to your bearings? Why make vidual connection to each bearing, with no ice that the job is done properly, when—

an grease several bearings from one con-, giving every bearing an exact, measured t, and have a tell-tale indicator to show the done? The amount delivered to each bear- adjustable and—not a bearing is missed.

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Proper lubrication of all bearings will reduce labor of oiling—eliminate waste of lubricant—increase production—reduce repairs and maintenance—prolong the life of equipment.

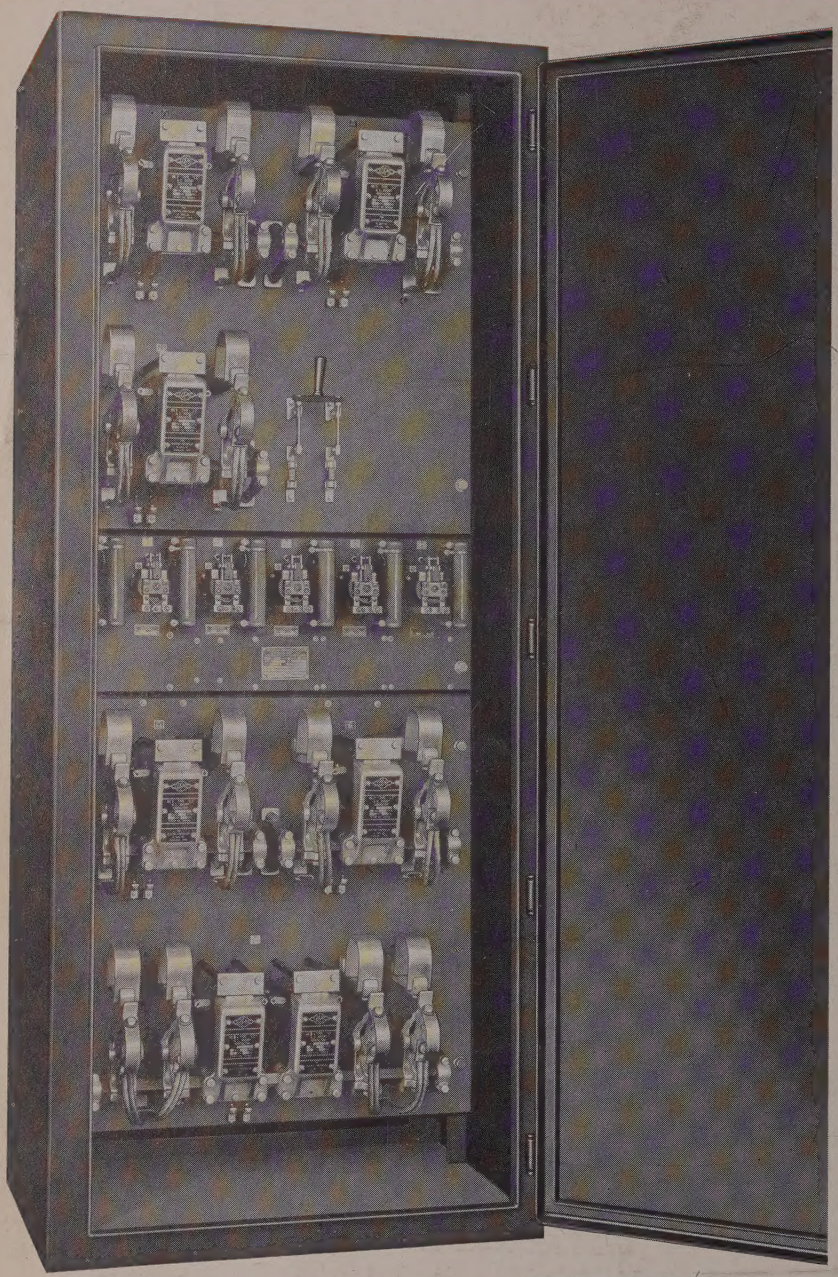
Write for bulletin describing the new Farval Multiple Measuring Valve. The Farval Corporation, 3270 East 80th Street, Cleveland, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Manufacturers of Automotive and Industrial Worm Gearing

FARVAL

MULTIPLE MEASURING VALVE

EC&M FULL MAGNETIC STA
for 600 HP WOUND ROTOR M



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to speed quickly. Since th
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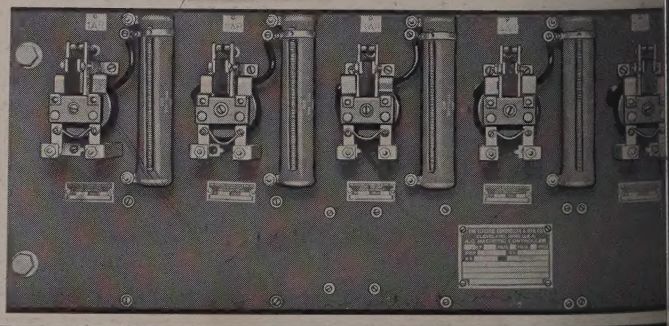

Close-up view of EC&M Frequency Relays used on above starter. At the right of each relay is a potentiometer resistor with sliding-bar contact which permits vernier adjustment to give exact operating results.

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